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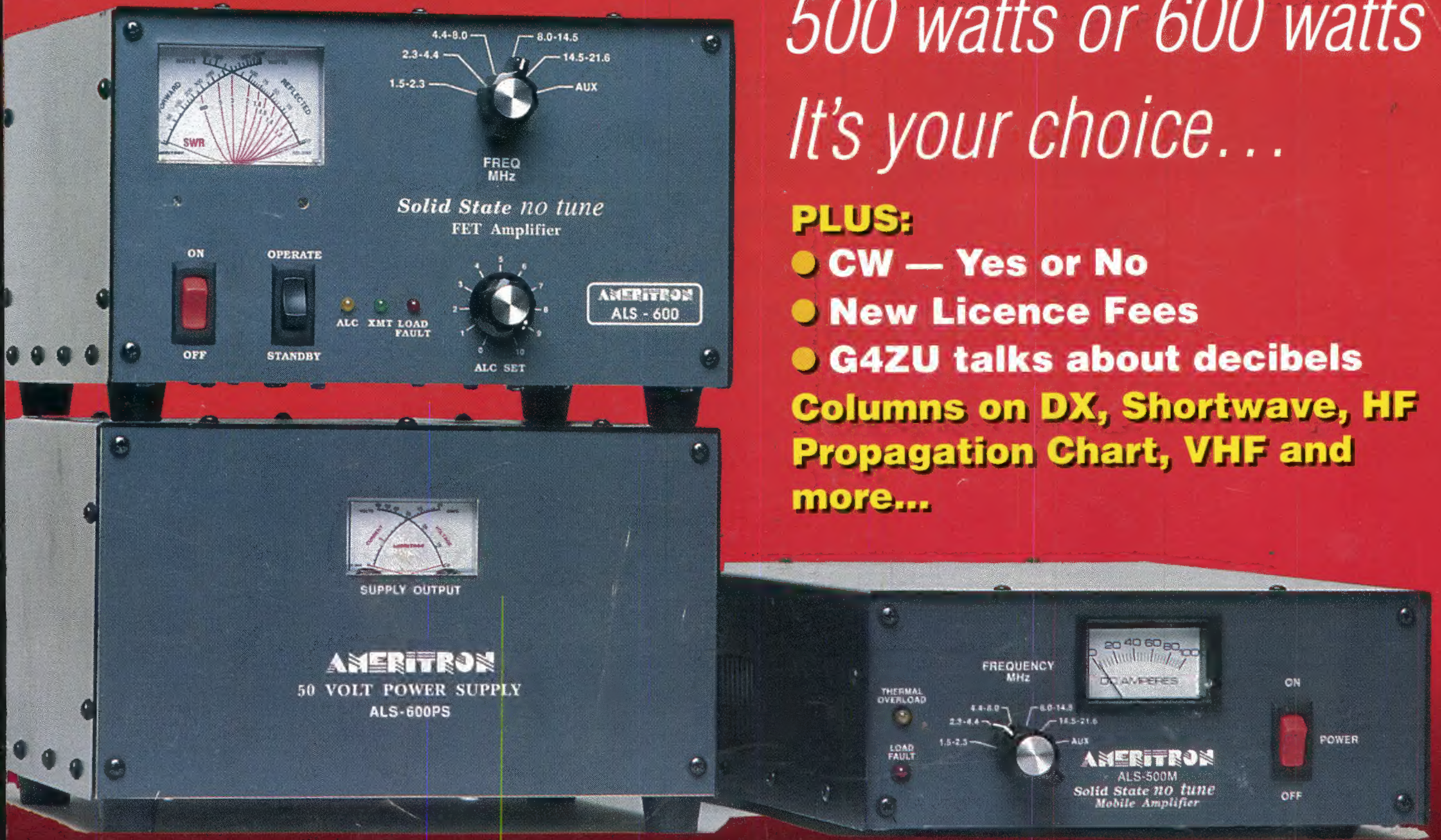

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February Issue - Vol 18 No 2 On Sale: 25 January, 1995

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DISCLAIMER: While all contributed material is read and checked as to its correctness, it is not possible to physically build and check every technical/project/modification article that appears in ARA. In consequence, we suggest that you use due care, be aware that most modifications will void a manufacturer's warranty, and that ARA accepts no responsibility for the small puff of black smoke which may be emitted from equipment at any time and for any reason.

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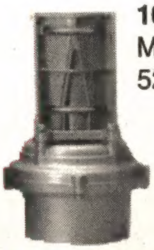

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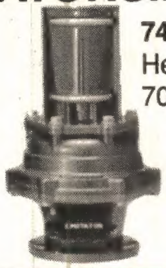

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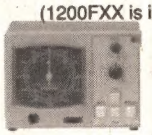

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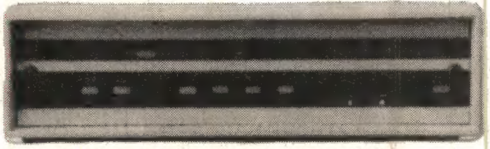

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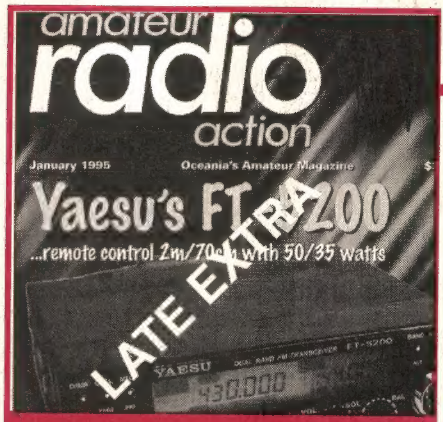
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WORLD NEWSDESK

WORLD NEWSDESK is compiled from a variety of sources including American Amateur Radio Newsline, RSGB broadcasts, the WIA, general internet news and overseas amateur magazines.

ISRAELI HAMSAT LAUNCH SET

The launch of the Gurwin One, Israel's first Amateur Radio satellite is now set for March 25th, 1995. 4X1AS who is a member of the Gurwin One launch team advises that orbital details are not available, but the satellite will be flying piggyback on a Russian remote sensing flight. Gurwin One will carry a 9600 baud BBS "Pacsat-style" transponder with a 70 cm downlink and six uplinks, three on 2 meters and three in the 23 centimetre band.

VOA-RIP

A part of shortwave history has disappeared from the radio waves. Radio Netherlands reports the demise of the Voice of America relay station in Bethany, Ohio. Bethany is located just north of Cincinnati. It made its last broadcast on November 15th. Radio Netherlands says that the federal government intends to use the land for other purposes and the former VOA transmitters are headed for a new home in Sri Lanka.

ROBOT RADIO

Closer to home, it seems that two years ago a computer temporally took over from the human disk jockey at Sydney Australia AM station 2SM. This, following a corporate takeover by a new ownership company. After a transition period of a few weeks the humans returned, and 2SM was reborn with a new program format.

Then something interesting happened. What broadcasters around the world call "the book" came out. The book is the ratings report on station listenership and guess what it showed. That's right, during the time that the computerised disk jockey was on the air the station's ratings had jumped upward by an amazing 40 per cent.

There's just gotta be a moral there somewhere...

NEW 144 MHZ RECORD

A new tropospheric ducting, continental distance record has been reported on the 144 MHz amateur band. On November 5, Rene Shaw, WB4MJE, of Big Pine Key, Florida, and Serge Szpilfogel, VE1KG, of Halifax, Nova Scotia, worked over a 1687 mile path.

The previous record was 1468 miles, set by K5WXZ and K1RJH, and had stood since October, 1968.

WB4MJE is crucially located for this work at the southern tip of the Florida Keys.

This information comes from Al Ward, WB5LUA, who maintains VHF and UHF North American distance record information for QST's "World Above 50 MHz" column.

NEW 5760 MHZ RECORD

A new over-land distance record has been reported on the 5760 MHz amateur band. On November 12, Al Ward, WB5LUA in Allen, Texas, and Ron Stefanskie, W9ZIH in Malta, Illinois, worked over a 738 mile path. The previous over-land record was 614 miles, set by N6CA and XE2/N6XQ.

Writing in the North Texas Microwave Society "Feed Point", Ward reports working W9ZIH on the evening of November 11, on 432 MHz with S-9 signals. They then tried unsuccessfully to work on 5760 MHz, having previously worked each other on the bands in between. They tried that night and the following morning.

In cooperation with Greg McIntire, AA5C, and W9ZIH, the first record breaking contact took place, between WB5LUA and Roger Schneider,

WB9OJR, of Green Valley, Illinois, who had joined the effort.

The distance was 633 miles.

AA5C and WB9OJR also connected, at 630 miles.

Continuing the effort, about three hours later, at 1652 UTC, WB5LUA and W9ZIH made the 738-mile contact, and AA5C worked W9ZIH, at 733 miles.

All contacts were on 2-way CW.

Al Ward said "It is really nice to know there are people active on the microwave bands who are ready to go when the bands open, and also to know that our equipment, which has only worked out to 250 miles under normal conditions, can actually work when the band opens up".

HAMVENTION DATE CHANGE

After four decades of fighting the uncertainty of weather conditions in Ohio in late April, ham radio's greatest show on earth is changing its date effective in 1996. That's when the Dayton Hamvention will abandon its traditional last weekend in April for a much warmer and less rain vulnerable mid May date.

Ken Allen, KB8KE, chairman of Hamvention '95 said....

"We had received comments over the years, increasingly of late from attendees and people in the flea market, and some of the other exhibitors that they really would like to see us move later in the year. Also the HARA Arena people were interested in seeing us move it later in the year because of possible conflicts with their hockey team that is based there".

Starting in 1996, the Hamvention will be held the third weekend in May. Hamvention '96 will take place the weekend of May 17, 18 and 19. The 1997 Hamvention will take place May 16, 17 and 18 and 1998 will be May 15, 16 and 17.

Why no change for 1995?

Many of the regular exhibitors at the Hamvention work up their convention schedules one, two or even three years in advance. Giving them only six months notice would not be fair to them. Therefore no change is planned for the 1995 Hamvention. It's still slated for the weekend of April 28, 29 and 30 at the HARA Arena in Dayton.

NEW LANE ON INFOPIKE

The so-called information superhighway is gaining a lane.

Press reports say that the Federal Communications Commission has cleared the way for a Virginia company to orbit a string of special communications satellites. The new birds are will provide two-way data services on a national and eventually global basis.

....☞

WORLD NEWSDESK (continued...)

The action permits Orbital Communications Corp. to launch up to 36 satellites. The orbit would be close enough to the earth for people on the ground to use special personal communications devices to send and receive messages and other data worldwide.

No date has been announced for this new service to become available to the general public.

PALESTINE RADIO

A Palestinian amateur radio operator in Gaza has made his first communication in almost fifty years using the Palestine ZC6 call sign prefix. According to the news service reports, the QSO took place on Friday December 2nd with the Palestinian operator identified as Dr. Sami Tarazi. His full call sign did not appear in the story, but he is quoted as saying that the ZC6 prefix had not been used since 1948. That's when the state of Israel was created.

Tarazi, a scientist, said his communication with a fellow radio ham in Slovakia was followed by enthusiastic responses from all over Europe and Africa. He said that other hams he QSOed with welcomed Gaza and the Palestinian call sign back on the air.

Palestine Liberation Organization leader Yasser Arafat commissioned the setting up of the Palestine Wireless Society in January after the PLO took control of Gaza from Israel in May under their peace accord.

Dr. Tarazi says that he believes that the re-introduction of the Palestine ham radio call sign prefix will definitely enhance and foster the Middle East peace process.

...PALESTINE UPDATE

Don't look for the December 11th, ZC6B operation to be counted for DXCC credit. This is because the call sign has not been valid since July of 1968. That's when the ZC6 prefix was deleted from the DXCC countries list. While the operator who is identified as Dr. Sammi Tarazi has reportedly sent the paperwork for this operation to the ARRL under the current DXCC rules it is unlikely that DXCC credit for Palestine using the ZC6 prefix can be reinstated. This is because the allocation list of international call signs shows that the prefix ZC6 is legally allocated to the United Kingdom of Great Britain and Northern Ireland.

Even if no DXCC credit is granted the QSL card from that operation is truly a collectors item. If you were lucky enough to contact ZC6B, QSL to Dr. Sami Tarazi, Box 1008, Gaza, Palestine via Israel.

RADIO FREE BOUGAINVILLE

Word is that the clandestine broadcast operation Radio Free Bougainville, thought to be off the air, is still operating. This, according to writer Gerry L. Dexter in his December column appearing in Popular Communications magazine.

Dexter now believes that Radio Free Bougainville is on the air from a number of secret mountain locations and heard mainly on 3.870 MHz.

He says he has reports that the station is only running a power output in the area of 75 watts these days.

For those of you not aware, Radio Free Bougainville has a ham radio connection. The station was established by the breakaway Bougainvillian government and was built with equipment donated by the Maine based International Amateur Radio Network. This is the group headed up by Glenn Baxter, K1MAN.

ORACLE TO NZART: READ OUR LIPS!

ORACLE, New Zealand' Organization Requesting Alternatives through Code Less Examinations has told that nations national Amateur Radio society that it plans to continue its lobbying efforts to overturn mandatory Morse Code testing. The lobby group has also issued a policy paper that takes to task the position of the New Zealand's Amateur Radio Transmitters.

The NZART endorses continuing the status quo.

Specifically, ORACLE says that the NZART statement does not accurately reflect the actual position of Morse code policy in New Zealand. Rather it reflects a conservative view of the national ham radio society. With regard to a Minister of Communications letter to NZART, ORACLE Managers say that the response says that the ministry is

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open to further discussion on this matter. They note that the Minister is legally the Government spokesperson for amateur radio. ORACLE interprets his words as meaning it would be unwise to adopt the three very specific positions recently proposed by the NZART.

ORACLE notes that the letter shows that the New Zealand Government has a more progressive view of amateur radio than appears to be the case for NZART or the IARU on Morse code policy. It believes that there can be a change at such time as evidence of significant opinion is produced.

Finally, ORACLE says that it is recognized by the New Zealand Government on this issue. It guarantees it will be active in producing evidence in support of abolishing Morse Code testing worldwide.

NO DEAL

Microsoft Corporation has issued a statement that denounces as a hoax a story appearing on the internet that says it has offered to purchase the Roman Catholic Church.

The hoax was circulated in the Internet as a wire service news report. It said that the merger deal would give the software giant exclusive electronic distribution rights to the bible and to the Vatican's art collection. In exchange, the Pope would become the Vice President of the company's new Religious marketing division, while two Microsoft executives would be vested into the church's College of Cardinals. Utterly ridiculous yes, but it seems that there are a lot of gullible people out there.

By Friday December 17th it appears that Microsoft had enough. They issued their own legitimate press story that condemned the church purchase story as being phony.

HAM SCOUTING NEWS

Dates have been set for the 1995 Jamboree On The Air operating event. JOTA is an annual event in which Boy Scouts and Girl Scouts and Guides from all over the world speak to each other by means of Amateur Radio. JOTA 1995 will take place Saturday October 21, 1995 at 00:01 hours local time to Sunday October 22 at 23:59 hours local time. For more information, contact the ARRL Educational Activities Department.

NEW 2 METRE TROPPO RECORD

In DX, a new tropospheric ducting, continental distance record has been reported on the 2 meter band. This, on November 5th when Rene Shaw, WB4MJE, of Big Pine Key, Florida, and Serge Spilfogel VE1KG, of Halifax, Nova Scotia worked over a 1687 mile path. The previous record was 1468 miles was set by K5WXZ and K1RJH. It had stood since October of 1968.

DXAC NEWS

The ARRL DX Advisory Committee, the DXAC, has voted 14 to 2 against a petition to add the Austral Islands and the Marquesas Islands to the DXCC Countries List. Those voting against shared 74 against a petition to add the Austral Islands and the Marquesas Islands to the DXCC Countries List. Those voting against shared the feeling that French Polynesia is not a Point 1 DXCC country.

For that reason these two island groups do not qualify as separate countries under the current DXCC rules.

The DXAC has voted 13 to 1 against adding the Balleny Islands to the DXCC Countries List. Most of those voting against this proposal felt that the Balleny Islands are a part of Antarctica.

Finally, the DXAC voted 14 to 2 against recommending establishment of an award for contacts made while operating mobile. Many comments stated the impossibility of verifying that contacts were indeed made while operating mobile.

RS-15 IN ORBIT

The new Russian Radiosport 15 satellite is in orbit and on the air. According to information supplied by Leonid Labutin, UA3CR, RS-15 was launched on December 26th at 03:00 UTC into a 64 degree inclination orbit with a period of 124 minutes 24 seconds. The apogee and perigee distance from earth were stated as 1946 and 1809 kilometres respectively.

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CW
— is it a Clear Winner or just a waste of time

By Neil Duncan, VK3ND

The place of CW (Morse Code) in amateur radio does not tend to be a neutral discussion point either in the journals or on the bands, I have noticed. There are some strong feelings on the importance or otherwise of CW. It would seem that people in the real world either really like CW or really hate it.

Much of this dichotomy arises because CW is still a compulsory hurdle to overcome in order to get yourself a licence to use the HF bands. There are those of us who think that such a hurdle is a good thing, and there are those of us who quite emphatically hold the opposite view. It is not CW itself that is in question; it is whether a knowledge of it should be compulsory for an HF licence. It is as simple as that.

For the discussion about to be unleashed, let us define the term 'those for' as being the group who believe the place of CW as a compulsory element of the licence for operation below 30 MHz is correct and wish that to remain the case in the future. The term 'those against' will be defined as belonging to the group who feel that it is no longer necessary to keep CW as such a licence hurdle. Here then is a debate between those for and those against.

Some facts

Let us look at some facts about CW first. In presenting these, I do not wish to be seen as supporting the case either for or against (yet). At this stage, I am merely looking at the merits or otherwise of CW as a mode of operation in amateur radio.

Fact one. CW will get through when other modes will not. Imagine a CW signal is being sent from point A to point B some considerable distance away, over the airwaves. Assume the best-possible CW receiver at B with a very narrow filter in use. Now lower the transmitter power being used at A until the signal is only *just* 100 per cent copyable at B, assuming a moderately slow sending speed.

Note the power level being used. Now try to employ any other mode at that power level, even with any receiver tricks you like at station B. I suspect you will not be able to copy what is being sent by station A. CW will present information at the other end when the strength of the signal is at its most marginal.

The consequence of this fact leads people to use CW for such adventures as moonbounce experiments, marginal or QRP DX work, low-power portable operation and, in some marginal instances, for emergency work. Provided you have a good ears, you can get away with CW communication when all else fails.

Fact two. Generating a CW signal requires the least degree of technical difficulty. No, I am not suggesting that a good CW rig is necessarily a simple rig. What I am saying is that by making use of the least number of parts and with the least expense, a CW signal can be produced. Not so with AM, SSB, FM, PacTOR, SSTV or the like — you need more bits and pieces.

Fact three. You can cram more CW QSOs (conversations) into a given spectrum space than QSOs of any other mode. I guess I should add that this is assuming that you either have the appropriate filters in the receiver or have the selective set of ears that many CW operators have. To verify this fact, tune through the first 15 kHz of the 40 metre band any evening you like. Count how many separate QSOs are going on. I reckon I have heard as many as 15 in that space. Try that on sideband! Such a scenario goes on even when the other bands seem dead, I note.

Fact four. A set of international conventions have been set up to allow communication on CW to take place even when a total language barrier is in place. '73 et QSL' or similar is a typical annoying QSO end point but illustrates the point. Fact four is a little weak because we could 'say' those things on a voice mode. On CW, communication seems so unemotional, crisp and neat when you are well armed with these conventions and are in QSO with a person who doesn't understand your language.

The argument 'for'

There seem to be two basic premises dear to the hearts of those who support the compulsory inclusion of CW in the requirements for an HF amateur radio licence.

One is that we are essentially a group of hobbyists who may be called upon in an emergency to use our radio skills to the benefit of the public. Such skills may well require communication under the most marginal of conditions, hence the need for CW.

Such a marginal set of conditions may well arise when someone is calling for 'help' from a very remote or even overseas area. Indeed, such is the way of propagation and band conditions that a response from an overseas person can become the only probable response on some bands. If the originator of the signal is using low power and a makeshift antenna, the argument for CW suddenly becomes well established.

The other 'argument' stems from some sort of assumed condition that a CW requirement selects a better class of person for the international and very public display we make for ourselves on the HF bands. The HF operator has proven themselves in a kind of academic way. That is, if the candidate for a licence is incapable for mastering CW then that person may well prove to be an unwelcome ambassador for his or her country if let loose on HF. Don't get angry, I am only quoting what I have heard said.

These are the main two supporting arguments I have seen in the amateur radio press and have heard over the airwaves. Ask someone who supports compulsory CW for whatever cause. I'd bet you that either or both of these arguments would come up.

If I may, I wish to add a third one of my own. At any time you wish, count the number of CW QSOs going on in the amateur bands between 1.8 and 30 MHz. Now count the number of *non*-CW QSOs going on. Whenever I have done this count, I have *always* found there to be more CW QSOs than the total of all other modes combined. Make sure you're using a good receiver and a good antenna for this test by the way. Fact one (above) would predict the result. On the assumption that I am right about this, it seems a logical argument that an ability in the use of the *principal* mode in use on the HF bands be a demonstrated one in candidates for a licence to use those bands.

The final comment 'for' is that Australia is a full signatory to the ITU regulations covering such things. The ITU requires that a proficiency in Morse Code be demonstrated before any amateur HF licence is issued. (In case you're wondering, this requirement does not cover CB or such services as School of the Air or Flying Doctor services and the like.)

The argument 'against'

Primary amongst the arguments against CW (in the sense being discussed) is one of an apparent irrelevance. "If I am never going to use CW on the amateur bands, why should I be required to present myself for a proficiency test in its use?", or similar.

Most assuredly, there are vast numbers of amateurs who, since having obtained their HF licences, have proceeded to *never* using CW again on a permanent basis.

To these people, such arguments as "CW is needed for emergencies" is annulled by the plethora of other-mode radio equipment on the market. That is, there is no shortage of gear more sophisticated than 'just CW' gear, able to be placed at the disposal of the authorities in case of dire emergency.

Let us amplify that point. Think of the recent emergencies in which amateur radio has taken an active role. Big bushfires, missing people in the scrub and possibly even the Great Tasmanian Goldfish Uprising of '93 come to mind. From what I have read, voice modes and, would you believe, packet radio really answered the call. I am not aware that CW has been used at all in such recent calamities.

CW has also been removed from many commercial areas, and a demonstrated proficiency is no longer required for the issue of many grades of commercial licence.

Finally, there is the argument that modern communication equipment is starting to bring voice and data modes closer and closer to the capabilities or CW under marginal conditions.

With a suitable pair of transceivers and with digital filtering, high speed data transmissions can take place when you can hardly hear the signals. Given that this is true, a weakened place for CW is presented.

My view

Right, let's see. One of the reasons politicians allow amateurs to carry on using highly-valuable spectrum space is that they are generating at very little cost an army of highly-trained radio communication experts. In case of emergency, there is a known source of equipment and expertise at their fingertips.

Another reason we get away with it is that we are also seen as an *experimental* service with a supposed yearly output of new experimental results and support for the world of radio communications. Let's keep appearances up to support this view. That is, please don't let the pollies listen to the usual chook noises on the two metre repeaters or let them see transcripts of certain 'club divisional meetings'.

International amateur radio communications work holds two key characteristics.

First, conditions often become extremely marginal (or dead!).

Second, there is a language barrier in many communication scenarios. I see CW as a prime resolution to effective communication under either of these cases. Apart from the 'emergency' argument I have already noted, the international aspects of HF communications is enhanced dramatically if the users of the HF spectrum capable of overseas contact have CW expertise. There is a massive political point to be made here as well as a logical one. These two points form the basis for my being in the 'for' group.

I do not support the concept that CW somehow 'weeds out the duds' from our ranks or that having a CW requirement for an HF licence enhances our chances of having top-flight radio amateurs presenting themselves on the international airwaves. The number of duds currently on such bands supports this view!

I am not a keen supporter of the idea that CW is an optimum sort of high hurdle for obtaining an HF licence either. If all you want is a high hurdle, try an IQ test or a long distance run, perhaps.

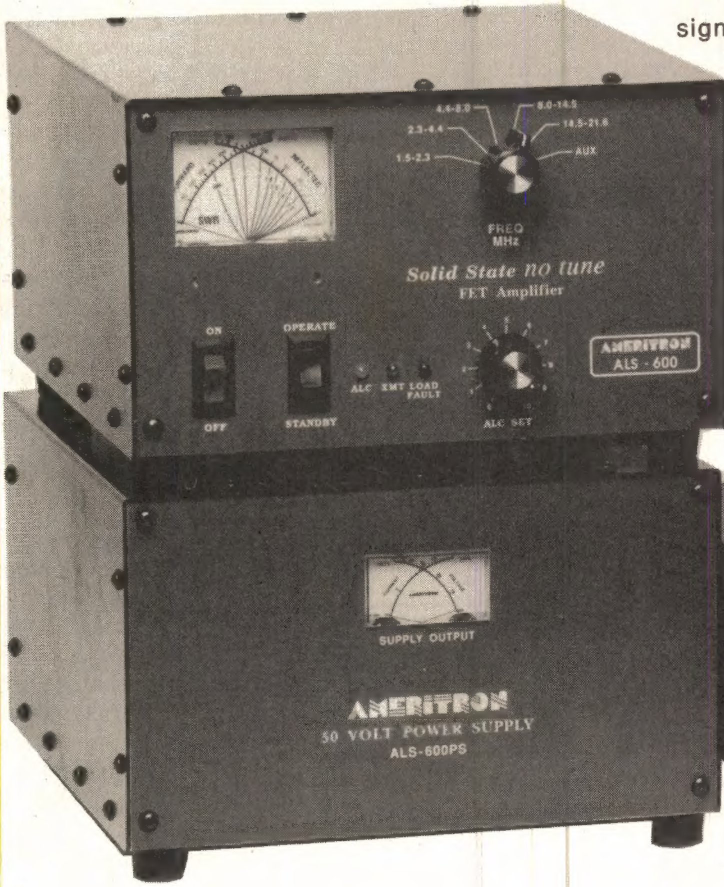
Rapid balloon blowing is another. No, I will stick to CW as being a prime mode on HF as my focus.

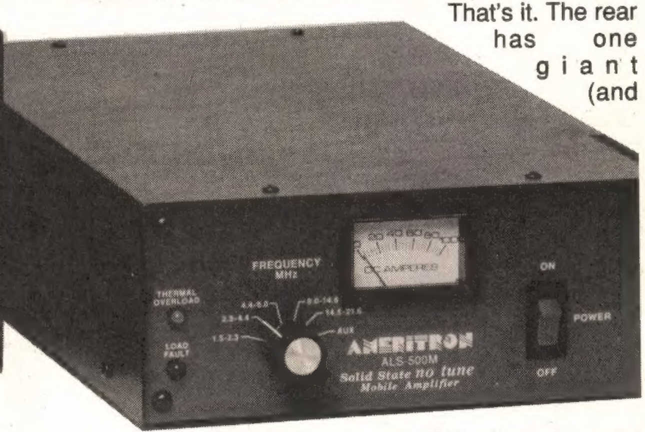
Finally an advertisement.

CW is a joy when you finally 'get there'. I unashamedly preset an analogy between the joy of mastering piano playing and working DX on CW. There are many things to learn if you wish to become really proficient on the use of CW in 'real' amateur radio. At a more basic level, the pleasure of having a simple 'across-town' CW contact is immeasurable.

I happen to think a certain kind of person resides 'down the CW end' of the bands... but I am not so brave as to describe that person. Give it a go! None of this paragraph supports compulsory CW in the HF licence test by the way.

The facts about CW are enough to do that.





TWO SOLID STATE HF LINEAR AMPLIFIERS BY AMERITRON

By Neil Duncan VK3ND

I saw a guy at a recent convention wearing a T-shirt with the slogan 'QRP is for wimps' printed on it. Well, I certainly hope he survived the day, because not everyone would agree with that statement! I must admit that I do, though — stomping my way through rare DX on 20 metres with a decent antenna and the full thundering legal limit is a joy second in magnitude only to seeing Collingwood lose a football match.

On review are two beautiful examples of suitable linear amplifiers to perform such delicate antics. They are both solid-state devices and neither requires the slightest tuning up when you move around the bands (apart from using the band switch). On air they boosted my signal reports by two to three S-points and left my transmissions unchanged with respect to quality. The larger unit was marginally 'louder', and carries some specific advantages — which is as well, for the smaller unit costs not much more than half the big one's price.

So what are these linear amplifiers, how well do they work, and why use solid state?

And is there any distortion, harmonic nasties or other spurious stuff left flying about the air-waves as a consequence of the amps' use?

Oh, and having watched a brand new, multi-thousand dollar solid state amp burn out before my very eyes (it was a review unit at a certain former editor's house), are these ones *guaranteed* bomb-proof? Read on!

The Ameritron ALS-500M

The smaller of the two units I have in the shack with me is light and compact. The ALS-500M is specifically aimed at the US mobile market, and there are a couple of things which make its target market obvious. To start with, it runs off a 13.8 VDC electrical system. Then there's its shape.

This potent black box is about the size of a shoe-box sliced in two horizontally. It's an appropriate shape for mobile use — not too high or fat, although it's pretty long.

Don't bung it in the boot, though — you need to be able to get at it each time you want to change bands.

On the uncluttered front panel you find one 0-100 amp meter, one four-way band switch and one power switch. That's it. The rear has one giant (and fairly unusual) DC connector, an earth lug, a connection for a PTT line to the rig, and a pair of SO-239 coaxial cable connectors.

Hooking it all up is a breeze. On goes the standard PL-259 lead to the antenna, and a short coax run back to the rig is simple enough. A pair of RCA plugs with some suitable cable in between fixes the PTT line's needs. Finally, you need to address the ALS-500M's power requirements...

Now this is where many prospective purchasers may well come unstuck. As it happens, I am the lucky owner of two pretty beefy 12 volt power supplies. One is a pretty traditional 20+ amp unit, used primarily for FM boxes, but the other is nicknamed The Brute — it is a 13.8 volt supply rated at 30 amps (nearly continuous, too).

So what do we need for the cute little ALS-500M? Uh oh. A mere *eighty* amps.

Yes, I said **80 amps**. Now, that is a little irksome, since I have a maximum of around 30 amps on tap. (No, it is *not* a good idea to parallel smaller supplies together to build up the current capabilities.

Any differences in their internal resistances will cause problems.) So I had no choice — I used the 30 amp unit and hoped for the best.

On air

Well, not to put too fine a point on it, the results are just stunning. Pressing the PTT button and talking put me on HF with this country's full legal limit (but with a few provisos, given my power supply arrangement).

The provisos were that I was limited to SSB or fast CW. If I whistled or said 'aaaahh' for more than two seconds or so, the capacitive reserve of my power supply ran out of energy, with the 13.8 volts suddenly collapsing to more like eight volts.

Each time this happened, the big tx relay in the amplifier dropped out while the power supply re-charged — and then another two seconds duration on/off cycle would begin all over again.

I was surprised to realise that there is no provision for feeding ALC line information back to the rig. As a consequence, if you run excessive power into this amplifier, there is no checking up on what you are doing.

I was a good lad and carefully kept my drive power well below 100 watts at all times (stupid rig won't *go* past 100 watts!) so it wasn't a problem, but woe unto those who run it into distortion.

If you can put those little provisos to one side, this amplifier is a little ripper. My only minor criticism is the great 'clunk' the antenna changeover relay makes.

On VOX operation in particular, it is a little irksome. Anyway, I always gained a minimum of 2 S-points advantage over the rig running barefoot.

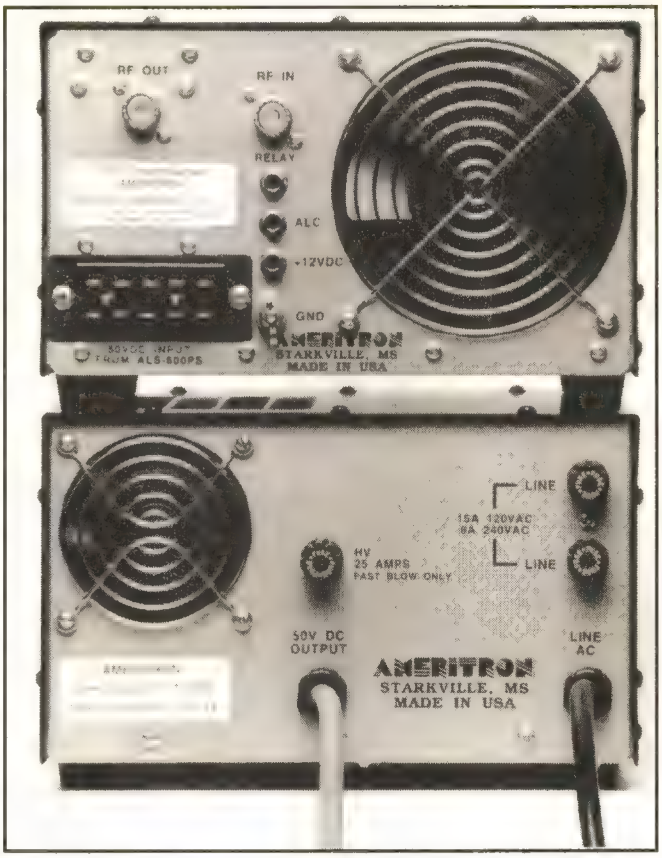
For overseas contacts, this often went to a 3 S-point advantage (theory, of course, says that is impossible with such modest power gains, but that's what everyone said.).

Switching the amp on increased my 'readability' no end.

What is more, I was able to unearth no distortion of any consequence, no reported splatter, no increase in TVI and best of all, no tuning up whenever I change frequency.

To owners of big valve amplifiers with their annoying and critical tune and load controls, hideous warm-up time, massive filaments, lethal volts and giant tank-like cases, (get ready, picture my thumb on my nose and my fingers waggling) RASPBERRY!

Next on the agenda was hooking the thing up to a car battery. (I hope you feel guilty about the amount of trouble I went to here, Mr Daycom!) I figured the best way to do this was to get a bit radical... and on the shack floor next to me at the moment is the battery from my car.



Yes folks, I ripped it out altogether. I used my special Kmart 100 amp jumper leads to hook things up and was then able to give the amplifier a *real* work out.

With the ALS-500M connected to a source capable of the full 80 amps, I could easily talk it up to the full rated current. That little front-panel meter jittered all around the place and the full quoted power output just poured out. With the car battery, I achieved the full specs the Ameritron people claimed.

The output devices — four 2SC2879 transistors, which cost about $200 each — are well capable of sustained high power. I also established that the quiet, internal high-volume fan cuts in only when needed.

The bottom line is that this amplifier seems quite suitable for sustained full power for about a two-minute period. After that time, the over-temperature lamp comes on and the unit switches off. FM users may need to cut down in the length of their overs (they should be short anyway!).

Likewise, if the SWR gets up as high as 3:1, the thing shuts down altogether. This also happens if you transmit with the band switch in the wrong position, or if the antenna you have plugged in is the wrong one.

I managed to run the unit intermittently (ie in yakkety-yak mode) for about 60 minutes before the new battery started to wilt a little, but I must say that up 'til then I was very impressed indeed.

Many will run this unit in its intended role as a mobile amplifier. I won't be one of them, though. I am far too wary of electronic systems in the modern car giving up the ghost if they are hit with excessive RF.

I have seen it all before. So would I like to own an ALS-500M? I sure would. I would stick a truck battery outside the shack window and run a trickle charger to it all the time. I might even use a solar panel.

I *really* liked the ALS-500M. It is a comfort to know you won't be breaking the law with the power levels it runs, that splatter or distortion problems are minimal so long as you keep the drive down a bit and TVI problems seem 'normal'. At all times, the increase in signal strength at the other end is most assuredly worth while and that's the whole point.

Note that a linear amplifier is *never* a substitute for a decent antenna, nor is it rational to switch one on when the signals are S9 both ways. Apart from that, I reckon an afterburner is the way to go. With this one, I have the best of both worlds. I have the joy of a no-tuning-up system but without the expense of a fully-integrated solid state amplifier. The nearest solid-state competitor is *way* over $3000 (with one exception — which you can meet below).

Look, there's no question that there are less-expensive valve amplifiers on the market, but many, like me, bask in the delights of no-tune broad-band solid-state. Really, I can hardly fault this beautifully-built, silent, efficient and clean little device whose only real vice is that it swallows up a pretty breathtaking 80 amps. (Oh, and by the way, the car wouldn't start when I put the battery back...)

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TWO SOLID STATE HF LINEAR AMPLIFIERS BY AMERITRON

(Continued from previous page..)

The MFJ ALS-600

At a cost approximately 60 per cent higher than the ALS-500M, the ALS-600 does not, at first sight, present 60 per cent extra real advantages over the smaller unit. True, it offers an additional 100 watts, but is that all that much? Now read the details...

The first and most substantial point is that this amplifier comes complete with a (separate) matching power supply. Next, it employs MRF-150 TMOS RF power FETS running from a 50 volt line for far lower distortion level and reliability. Third, it carries a wide range of additional features, such as an adjustable ALC line and a cross-needle SWR bridge. In short, it is a much more sophisticated little amplifier unit then the ALS-500M. I say 'little' since this device is not that much bigger than the 'mobile unit' we've just discussed — as long as you don't count the size of the external power supply which comes along with it, but the cables are easily long enough for you to put it under the desk, out of site. All switching happens at the amplifier itself, not the supply. It is far smaller than any valve amplifier of similar ratings that I know of.

Hooking up your transceiver to the ALS-600 is just as easy as it was for the ALS-500M — with the additional bonus that the power supply has all the leads and plugs you need, all set up, ready to go. Of course, there is one more line to connect to your rig.

The ALC output from the amplifier runs precious data back to the transceiver and will need one more cable with appropriate plugs and connectors. You have to supply this one (and the one for the PTT line), but that's no real worry as a very simple Hi-Fi-style RCA-RCA hookup cable is ideal.

There are lots of additional things about the ALS-600 which have been really well thought out, too. The almost silent, high-volume fan dominates the rear panel and probably accounts for the additional height of the unit.

On the front panel you have an ALC adjustment knob to compensate for the varying level of transceiver power which may be encountered, and for variations over the different amateur bands. It is also the knob that you adjust back just slightly to keep within the legal VK power levels.

The cross-needle SWR bridge measures RF output power and is actually most useful.

You can see at a glance how much power you are running and what the SWR levels are like. It is another story if you want to see how much voltage and current the device is operating with, though, particularly if you've hidden the supply under the bench. There's another (illuminated) cross-needle meter for this, but it's on the front panel of the power supply. That's all there is on the supply's front panel, by the way. To see the current and voltage level, I held the microphone, pressed the PTT and then clambered down on my knees for a good, old-fashioned grovel.

The power supply is designated the ALS-600PS. It's a real beauty of a power supply, too. The power transformer really belongs up a lamp post, rather than down here in the shack, and a not-so-quiet fan comes on with the power to keep things cool.

Various inrush and low voltage protection schemes are well implemented, and these reassure you that it is also designed for a long life. In short, the quality of the ALS-600PS is a major feature of the unit on review. By the way, if you live in the upper floors of a high rise apartment building (or have a masonite floor in your boot) put the power supply down *carefully*. It weighs heaps (14.5 kilograms or 32 lbs) and you should think of the people below you.

According to the markings on the band switch, the amplifier operates anywhere in the range from 1.5 to 30 MHz which should suit any of you setting up in opposition to Radio Australia.

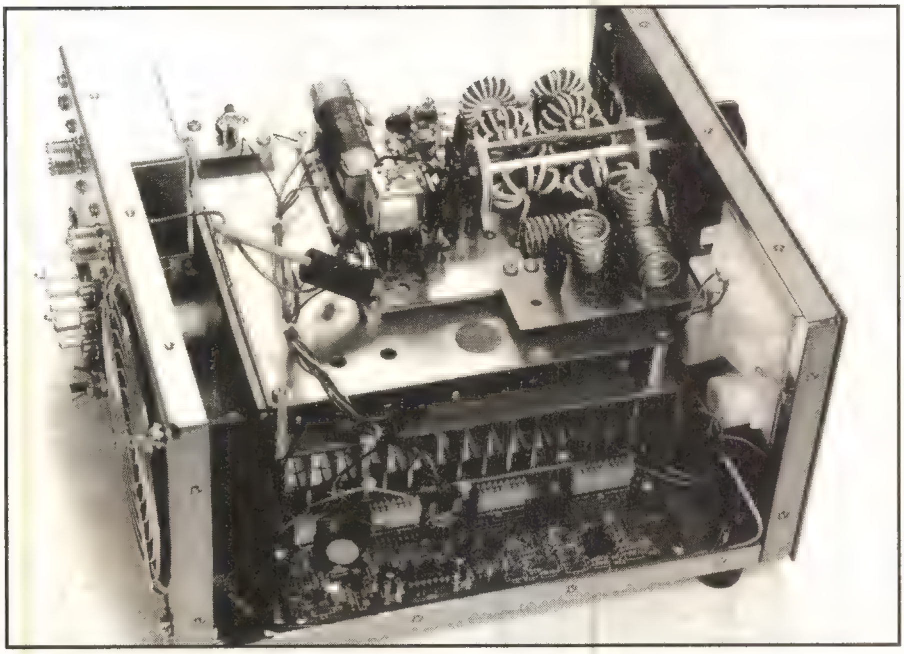
Well, maybe not — if you run constant carrier at the full 25 amps (at 50 volts), you will be limited to about five minutes on air before the over-temperature systems cut in.

On the air...

I found that you have to be a little careful with the ALS-600 with respect to SWR. If the output SWR rises much above 2.5:1 then the 'load fault' light is likely to come on and shut the amplifier down. Similarly, when the ALC LED starts to flash, you know that you are reaching the power limits of the amplifier. Either wind the ALC set knob up or decrease your drive power or you will be similarly shut down.

Apart from that though, the ALS-600 must be just about the most simple linear amplifier to use. You transmit somewhere between 1.8 and 30 MHz (hopefully on an amateur band) with between 75 and 100 watts and the appropriate watts come out of this compact black box. Into a dummy load, the unit produced a cool 400 watts of carrier or 600 watts of SSB. On voice, the room lights dimmed perceptibly with speech peaks and I could hear my voice softly coming from the direction of the power transformer.

Naturally, I limited my power to the Australian legal limit when an antenna



The rugged construction of the Ameritron units is obvious as shown by the ALS-600 interior.

SPECIFICATIONS

PRICE:	**ALS-500M $1850** **ALS600 $2995**
Frequency coverage:	1.5 to 30 MHz continuous.
Input:	Broadband, resistor swamped. Maximum SWR of 1.5:1 at 50 ohms.
Drive power:	
ALS-500M	60 watts (100 watts max).
ALS-600	75 watts typical.
Output circuit:	Broadbanded low-pass circuit.
Power output:	
ALS-500M	500 watts PEP SSB 400 watts CW.
ALS-600	600 watts PEP SSB 400 watts CW.
Power requirements:	
ALS-500M	13.8 VDC, 80 amps max.
ALS-600	50 VDC at 25 amps and 14 VDC at 1 amp (supplied)
Output devices:	
ALS-500M	four 2SC2879.
ALS-600	four MRF-150 MOSFETS.
Metering:	
ALS-500M	0-100 amp DC meter.
ALS-600	cross-needle SWR meter with true peak indicating wattmeter.
ALC: (ALS-600 only)	Negative going, 12 VDC adjustable.
Efficiency:	40% on CW.
Keying:	100 mA sink to ground. Relay operation.
Third order **IMD** at rated output	-25 dB claimed. This was easily matched in testing.
Dimensions:	
ALS-600	30.5 X 24 X 18 cm DWH
ALS-500M	39.4 X 22.6 X 9.5 cm DWH
Weight:	
ALS-600 5.7 kilograms,	
ALS-500M 5.5 kilograms.	
ALS-600PS	
Voltage requirements:	120 or 240 VAC
Output:	50 VDC at 25 amps and 14 VDC at 1 amp.
Metering:	Cross-needle volt/amp meter.
Cables supplied:	two metres, pre-wired with connectors at both ends.
Dimensions:	30.5 x 24 x 18 cm DWH
Weight:	14.5 kilograms.

was connected. At that power, the unit was simply loafing along. In fact, looking at things with that perspective, I suspect that this amplifier will have a very long life indeed. The broad band aspect is not the only draw-card here. Replacing valves becomes a thing of the past with solid-state gear.

The reports I received were most gratifying. I gained an average of 2.5 to 3 S-points — almost an identical set of gain reports to those received with the ALS-500M. I guess the difference is that the apparent 'talk power' of the bigger amplifier was reported to have been better. This was really noticeable when I switched from one amplifier to the other, and may have been due to the ALC circuit or perhaps the more robust power supply arrangements. It may be attributed to the FET devices too — ask anyone who owns a MOSFET stereo to compare their amplifiers with ordinary old transistorised ones!

By the way, I would certainly add a low-pass 'TVI' filter after any linear amplifier as a matter of course, but after a broadbanded amplifier it is an *essential* precaution. Actually, I often wonder why such filters are not built into amplifiers as supplied. Anyway, any harmonics or other spurious emissions coming from this amplifier were measured as being in the order of tenths of a watt when the device was running full power. Such is the cleanliness of the amplifier, so I shouldn't be too critical here.

Summary

Overall, I found the ALS-600 a joy to have on the shack and, believe me, it is now on the 'wish list' here.

To change from any spot on any band to any spot on another, I only had to switch bands on the rig (that is, *any* rig), click the great clunky switch on the amplifier, and maybe flip the antenna switch — and off I'd go.

I found the ALC knob to be a set-and-forget one, and likewise, you don't miss that hidden cross-needle meter on the power supply all that much.

The unit is superbly built and looks great too. It sits so inconspicuously beside the base station rig and innocently hides the real grunt it generates.

The on/off switch and the operate/standby switches are big and easy to find, which is appreciated when you are in a hurry. On air the ALS-600 is simple and direct in what it does — it makes you much louder and does so without fuss and without changing your signal.

Yes, the ALS-600 has a seemingly high price tag (nearly $3000) and thus may provoke comments like 'hey, I can buy a valve amplifier for almost half of that'.

With this amplifier you have real class — instant 'warm-up', longevity and, last but not least, the glory of no-tune operation. Its competitors start at $3500 and lack some of the features we see here.

But don't forget there is no ATU or means of coping with high SWR in this amplifier.

Some of the competition amplifiers (with even higher price tags) have automatic antenna tuners. The only disappointment is the lack of very high-speed antenna changeover.

A pin diode external device is available but many, like myself, love QSK CW operation and that is not possible with this unit as supplied.

I found both amplifiers to be just excellent, and as my antennas are reasonably flat with respect to SWR, I have no need for an ATU. I rate the ALS-600 as one of the most docile, likeable and effective devices that has ever been in this shack.

Our evaluation units were supplied by Daycom Communications, Huntingdale, Vic.

LICENCE FEES TO DOUBLE!

Australian amateur licence fees are set for a major increase this year, according to news from the Spectrum Management Agency (SMA).

A new scheme, presently undergoing final fine-tuning, will see a completely new fee schedule introduced with various components including a 'spectrum access tax'. The fees will differ for the various classes of licence.

Three main parts will go into each fee, an SMA spokesperson told a meeting with WIA representatives in early December.

The first component is the **issue/reissue** fee, expected in most cases to be $25 per annum. The meeting was told that it costs the SMA $140 to issue a new licence and $11 to reissue an existing one. As licences are held for an average of around 10 years, the issue cost can be recovered over that time at $14 per year, plus the $11 reissue fee, making $25 per annum.

The second component of the new licence fee is the **Spectrum Maintenance** charge, a pro-rata fee based on the actual costs incurred by the SMA in undertaking its management role. This is where the new scheme sees different fees introduced for the various grades of amateur licence. The current proposal suggests this component should be $5 for Novices and the yet-to-be-introduced VHF/UHF-only Novice Limited, $8 for Limited and Intermediate (the former Combined licence) and $9 for full calls. If you add the issue/reissue fee to the Spectrum Maintenance charge you arrive at roughly the same figure as has been charged for the past couple of years. However, there will be a *third* component of the proposed new fee structure, and it is poised to be the most expensive part.

The federal government has decided to *tax* all uses of the RF spectrum. Amateur radio, despite its non-commercial nature and demonstrated community service and safety functions, will not be exempted from the new **Spectrum Access Tax**. With the recent introduction of the Class Licence, users of the **Citizens Band Radio Service** pay no fees whatever under the new arrangements. Individuals are no longer required to hold a licence to operate a CB transceiver.

The amount of Spectrum Access Tax to be charged to amateur operators will vary according to the amount of spectrum available to the various classes of licence, with a minimum fee of $20 to apply. A breakdown of the proposed new fees appears in **Table 1**.

SMA officials were at pains to stress that the figures were not final, and may vary by up to $10 either way.

The way the amount of Spectrum Access Tax is arrived at is not how many channels a service occupies, but rather how much spectrum is denied to other users. According to the SMA, five factors are considered in arriving at the tax, applying only to bands on which the amateur service is a primary allocation:

- **Geographic location**: usage and demand are taken into account in this part of the formula. Clearly, a specific cross-town channel would be worth more in Sydney or Melbourne than in, say, Port Hedland, as the overall number of users in those two major cities is far higher than in outback areas.
- **Spectrum location**: this refers to the frequency, where 'prime' channels in the VHF and UHF bands are more valuable than, say, those at SHF.
- **Bandwidth**: A television channel would be taxed at a higher amount than a stereo FM broadcast channel as it uses correspondingly more bandwidth. In amateur terms, a 30 MHz-wide band would cost three times as much as a 10 MHz-wide band at the same frequency.
- **Area of coverage**: the geographical coverage afforded by the frequency in use. Again, a channel which offered good coverage of the entire Sydney or Melbourne metropolitan area at a useable commercial frequency would cost more than an equivalent channel in a rural area.

Initial calculations by the SMA, in which the above weighting factors were calculated for the primary amateur allocations and divided by the total number of amateur operators in the country, produced tax amounts in the order of $300 to $400 per licensee. The SMA decided that a licence costing this much would be impractical — unaffordable — for a substantial number of operators, so the discounted amounts shown above were decided upon instead. Again, these figures have not yet been finalised, but final arrangements should be in place and announced by March 1 this year. With the way of arriving at the tax determined by the number of users in the service, it seems logical to expect that the fee could *reduce* if the number of licensees increased, and this is to be expected when the Novice Limited grade of licence is introduced later this year. A five-year licence will also be offered. This will cost less than five single-year licences, as the SMA cost of reissuing the licence would obviously be substantially lower. A discount in the order of $45 is expected, although a five-year licence should cost around $300. Recent traffic and bulletins posted on packet radio bulletin boards around the country indicate that many operators have reacted badly to news of the size of the proposed fee increases, although a smaller number of correspondents have indicated their reluctant acceptance that the increases were inevitable.

Some groups have even indicated that they will boycott any fee increase, saying they will continue to operate without any fee payment.

Amateur Radio Action will keep readers informed with developments in the licence fee and regulations area as news comes to hand.

Meantime, you may care to send off a protest to your local member along the lines on the opposite page.

	Issue/ Re-issue	Spectrum Maintenance	Spectrum Access Tax	Total
Unrestricted	$25	$9	$35	$69
Limited	$25	$8	$34	$67
Intermediate	$25	$8	$34	$67
Novice	$25	$5	$20	$50
Novice Limited	$25	$5	$20	$50
Beacon	$11	$5	$20	$36
Repeater	$25	$9	$20	$69

Table 1. The proposed fees.

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Tel:..

TO:

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Dear..,

AMATEUR RADIO LICENCE FEES

I wish to bring to your attention the matter of recent increases in fees for Amateur Radio Station licences proposed by the Spectrum Management Agency (SMA).

I would like to refer to a few basic aspects of Amateur Radio operations.

Amateur Radio is a recreational and educational "hobby" pursued by a wide range of people in our community. There are about 18,000 Australian amateur radio operators and many millions worldwide.

Amateur Radio is of immense benefit to the community.

There are many instances where it has played a crucial and important part in providing emergency communications where civil and military systems have been unable to perform. eg. communications from Darwin following Cyclone Tracy, bushfires in each State, earthquakes in NSW etc.

It is a hobby that produces effective self training in technology. Many young people graduate to a career in electronics having had their ambitions developed through such an interest. The Scouts and Guides movements of Australia have many stations used in training of their youth. There is immense social value in a recreational hobby particularly suited to handicapped persons and also senior citizens.

The Amateur Radio Service provides a ready pool of trained personnel available for service to the country in many ways. Australian Amateur radio operators are among the world leaders in development of new technology and have recently made significant contributions to research in areas such as satellite technology and radio propagation studies. The hobby provides a valuable service in development of international relations. There are many more positive aspects that could be mentioned.

You will note that among the charges proposed is a "TAX" on spectrum usage. My understanding is that usually a tax is levied where some opportunity exists for that tax to be recouped by profit. Making of any profit through Amateur Radio is strictly forbidden by regulation. A tax upon a usage of radio spectrum which is already set aside by Intentional Convention for Amateur Radio use seems unfair and inequitable. No other country in the world levies such a tax on their Amateur Radio operators.

I request your support towards action to have the proposed fees rescinded and another more suitable approach taken. We would consider it an excellent result if we were granted licences free of charges as is the case in the United States where the community, educational and recreational value of Amateur Radio is highly valued.

Should you require further information and comment I will be willing to oblige.

Yours faithfully,

....

Operator of Amateur Radio Station ....

Date:

The Comrad TeeNCee 2 An Australian-made TNC - for around $200

By Neil Duncan VK3ND

There is an ever-increasing popularity associated with packet operation on the VHF bands. It is not hard to see why, either. It is by no means unusual for the average amateur radio operator to have a computer of some sort in the house, so why not connect it up to an amateur rig and converse or swap files and information over the airwaves?

So what do you need to perform this feat? What is the least expensive way associated with this still-new aspect of the hobby?

On the assumption that a) you have an FM box (and antennas!) all set up ready to go and b) that the computer has been shifted into the shack, you will need two things: First, you will need a suitable terminal node controller (TNC), and second, a suitable piece of software.

Now, commercial TNCs seem to come in two sorts — the expensive imported ones, and the *frightfully* expensive imported ones (they are the ones which work on HF as well as VHF and offer a multitude of modes). Let's confine ourselves to the first sort.

With prices starting at just under $300, a typical 1200 baud packet-only TNC is now a highly-reliable and well-established item on the market.

Software to run them starts at the general-purpose level (you could try the terminal program in a 'Works' program or the one supplied as standard in the Windows environment) and extends to some really sophisticated numbers. Amateur Radio Action recommends Tony Lonsdale's **paKet** program which is inexpensive, ultra-reliable — and Australian-written. In fact, after a couple of quick phone calls from us to the manufacturer, paKet will be supplied with all TeeNCee 2 kits.

Actually, there is a third sort of TNC available, too.

These are the ones with a trivially simple decoder box at the rig end of things and the real intelligence resident in software inside the computer. These are fine for some applications but lack the goodies that the first two sorts of TNCs have. For a start, the computer must be on before any function works at all, an important point if unattended mailbox operation is desired.

Second, some of these devices don't allow binary file transfers, which limits their application somewhat.

On review this month we have a little black box of the first sort — except that it is sold as a **KIT** and it is fully Australian designed and manufactured throughout. It designated the **TeeNCee 2** and is small enough to fit in the palm of your hand.

In appearance, it is simplicity itself. The front panel sports an on-off switch and five LEDs... and that's it. Three little sockets is all that fits on the back panel. The review unit arrived here fully assembled (who doesn't try my soldering?!) and worked at the first power-up, requiring only that the appropriate cables, a computer and suitable software be supplied by myself.

The TeeNCee 2 costs about $190 for a kit of parts, and this works out at about one-third less in price than similar but fully built-up overseas units.

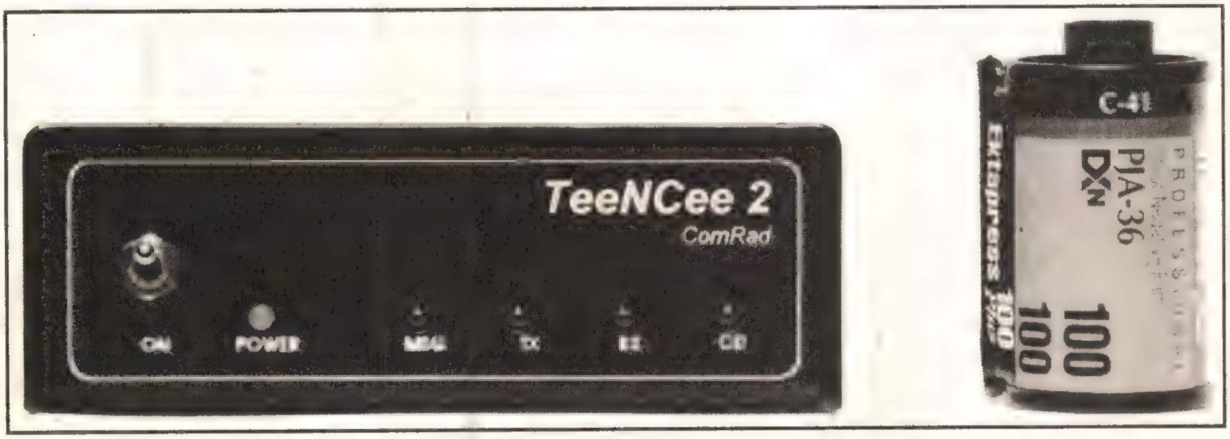
The completed TeeNCee 2 by Comrad is a delight to use and looks every part a commercial unit. In fact, the presentation of the TeeNCee 2 will rival certain commercial units and is a credit to its designer.

Setting up

Some initial difficulties surrounded connecting to the nine pin connector (DB9) on the TeeNCee 2. The problem is that the adaptor I had didn't want to fit into the socket directly - something to do with those little chassis mounted nuts on the back panel. After a junk box search, I found the easiest solution being to make my own adaptor using a DB9 line socker.

To connect to my rig I only needed four of the signals on the eight pin DIN socket. Locating an eight pin DIN plug could be a daunting prospect, but that didn't become a problem as a five pin DIN plug fits the socket - with all the necessary signals.

DC power for the TeeNCee 2 can be arranged in three ways. You can drag out the appropriate volts from the radio provided it can supply from 8 — 14 VDC at a little less than 100mA. Alternatively, you can supply raw AC at the same sort



of volts or (as I did), use a plug pack for 12 volts. The little plug on the rear panel will accept either.

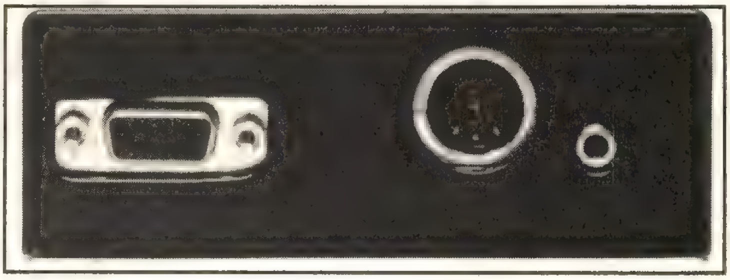
This has the advantage that it is not polarity sensitive (wrong polarity has seen the demise of plenty of devices in out hobby!) and that sure simplifies things. Do be careful about keeping the negative lead floating though. Actually, that may be an annoyance to some so I reckon a plug pack is certainly the way to go.

Finally you will need a suitable computer program. I used paKet and with almost no fuss and recommend that other users do the same.

Whatever you use, the plan is to get things running at 1200 baud first (that is the initial computer/TeeNCee 2 interface speed) and then switch over to a 9600 baud or even an 19200 interface speed. Putting your own callsign into the device is also necessary before proper operation can commence.

On air

I connected, disconnected chatted and digipeated through other stations and generally had a ball in the opening session with the TeeNCee 2. There are no apparent vices in this kind of operation. Inspection of the circuit board reveals what appears to be an expansion header of some description next to the microprocessor. Later discussion with the designer revealed that optional interface boards are already..."on the drawing board". These will fit into this mystery header and allow the TeenCee 2 to break from the VHF band. There is a mailbox system built into the TeeNCee 2 for those who like to leave the rig and TNC running when the shack is unattended.



This allows for about 26k of space, provides the usual set of operating commands and generally behaves itself as you would expect.

There is no memory expansion of this facility that I know of. (Some overseas units offer to 512k of expansion space).

I cannot comment the ease or otherwise of building the TeeNCee 2 from a bag of bits 'cos I was sent a completed unit. The PCB is a double sided, through plated effort and is superbly annotated and well laid out. Photographs of the PCB are shown in the project elsewhere in this issue.

There is a fair density of components but don't be put off — the required soldering and hardware assembly feats would seem to be within the ability levels of we normal amateurs.

The supplied manual is brief; with discussions regarding construction, the command set, an introduction to using packet radio and the MailBox.

I particularly like the on-line help offered from the TeeNCee 2 itself. If you type HELP: SUMMARY you get the command set listed for you as below.

COMMAND SET LISTING

Addrdisp
AMonth
AUtolf
AXdelay
AXHang
Baud
BEacon
BKondel
BReak
BText
BUdlist
Connect
CAlibrate
CANline
CANPac
CBell
CHeck
CMdtime
COmmand
CONmode
CONOk
CONStamp
CONVerse
CPactime
CR
CRAfter
CStatus
Disconnect
DAytime
DAYUsa
DElete
DIGipeat
DISPlay
DWait
Echo
EScape
FLow
FRack
HEaderln
HELP
?
HId
Id
K
Kill*
KISs
List*
LCalls
LCOk
LFadd
LFIgnore
Mall
MAXframe
MBox
MCom
MCON
MHeard
MHClear
MOnitor
MRpt
MStamp
MYcall
MYAlias
NUcr
NULLs
NULF
NVget
NVSet
Paclen
PACTime
PASs
PASSAll
PErsist
PIdcheck
Read*
REConnect
REDisplay
REDO
RESet
RESPtime
RESTart
RETry
Screenln
SEnd*
SENDPac
SLottime
STart
STOp
STReamcall
STREAMDbl
STREAMSw
Transparent
TRACe
TXdelay
TXflow
TXUifram
Unproto
USers**V**ersion*
Xflow
XMitok
XOff
XON

In addition, the manual gives a complete description of these commands but, in fact, if you type **?** followed by any one of the commands, an on-line help system for that command is invoked.

The TeeNCee 2 includes hardware to operate (wait for it) an antenna rotator interface.

Hmmm, maybe satellites need such things, I dunno. I didn't really have a go at that aspect of the TeeNCee 2. *(It's there so people logged into an HF enthusiasts' network called a DX Cluster can automatically aim their HF antennas at the exotica! Ed.)*

Incidentally, Tony Lonsdale has modified the "paKet" installation software to include the TeeNCee 2 as one of its optional help files.

Summary

The Australian-made software design and hardware inside the TeeNCee 2 is of first-rate quality and deserves high commendation indeed.

As an entry level TNC, I am hard put to fault the TeeNCee 2. As a focus for serious work, it is also excellent. Probably best of all, though, it is really tiny. I bet it finds its way on many a field day as a consequence.

Warm up those soldering irons, this Australian-made product is a beauty!

If you can't find your soldering iron, you can order a pre-assembled and tested unit for only a few dollars more, otherwise, I suggest that you turn to page 42 and build up your own unit.

It's that time of year again...

THE 1995 CENTRAL COAST FIELD DAY at WYONG RACECOURSE

The central Coast Amateur radio Club will be holding its annual Field day on Sunday 26 February 1995 at the prestige venue, the WYONG RACECOURSE, in Howarth St Wyong.

The CENTRAL COAST FIELD DAY is one of the longest running events in the Australian amateur radio calendar and this will be the 38th year of this popular and growing event.

As usual, the large contingent of well-known suppliers of electronic equipment, components and books will be attending. These companies will have their latest products on display and many traders will have items on sale at very special Gosford Field Day prices.

Last year the popular "Flea Market" attracted a large number of people who traded an enormous amount of surplus electronic equipment to eager buyers from trestles, their trailers or from the boot of their car. The organisers expect the flea market to boom with even more vendors than last year.

The organisers, the Central Coast Amateur Radio Club Inc. have kept the format for the Field Day in line with the changing face of amateur radio.

In recent years seminars on a wide range of topical subjects ranging from packet radio to satellite communications have been a popular attraction. This year an even bigger program of interesting lectures and equipment displays has been arranged.

Some attractions, however, have remained unchanged and ever popular and among these is the so called "disposals sale" of many thousands of new and used items of surplus equipment ... many bargains going up for grabs.

Trading and all programmed activities will commence at 8.30 am.

ADMISSION ... Adults - $8.00 ... Children under 12 - Free ... Seniors Card $5.00 ... Pensioner -$5.00. A special group concession will also be available on application.

FIELD DAY ATTRACTIONS INCLUDE

* ALARA Stand
*Flea Market
*Disposals
*Various Amateur Television Groups
*WIA Historian Stand
*Packet Radio Displays
*QSL Bureau
*Ladies Stall

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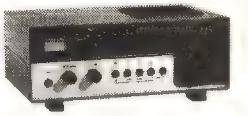

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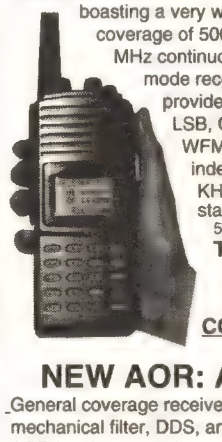
A highly sensitive hand-held receiver boasting a very wide frequency coverage of 500 KHz to 1900 MHz continuous. The all-mode reception provides AM, USB, LSB, CW, NFM & WFM, with independent 4.0 KHz SSB filter as standard.



50Hz resolution!

TOO MUCH TO TELL HERE!

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General coverage receiver with mechanical filter, DDS, and ECSS. AOR has introduced new standards in receiver design. DDS, ECSS and Collins mechanical filters,bring the AR3030 receiver in to the $4000 class

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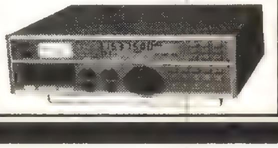
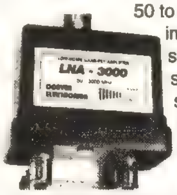


JRC: NRD-535G

World's best short wave receiver. Superb features include double front-end tuned circuit, optional ECSS, band pass tuning, all mode reception, memories, search, scan & sweep and modular construction.

LNA-3000 is a low noise wide band preamplifier for the freq. range between 50 to 3000MHz. Ideal for improving scanner sensitivity, weather satellite, TV & radio signals, and to increase the sensitivity of test instruments!



NEW - LOWE PR-1 preselector to eliminate local RF interference, a MUST for any serious SWL. **$579**

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SP-2000/7000,

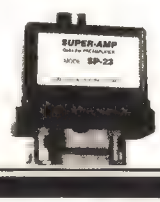
Hi quality preamplifier for 2m & 70cm band. Hi gain, low noise & coax. switching! Typ. gain 20dB, noise fig.0.8 dB/2m, 0.9dB/ 70cm. **$489**

UEK-2000 SAT

Special converter for "OSKAR" satellite reception. RF: 2400 MHz, IF: 144MHz. Build in LNA, noise fig. of 0.6db. **$ 846**

SP-13

Low noise GaAs-Fet preamp for SHF 2300-2400 MHz band. High gain (25dB) and a noise fig. of 1.2dB. **$ 789**



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- *Trade Displays and Sales
- *Satellite Television Receiving Demonstration
- *WICEN Display
- *Fox Hunts

SEMINARS AND WORKSHOPS There will be several sessions throughout the day on topical subjects. Including talks on specialised topics and presentations by equipment suppliers.

A FIELD DAY INFORMATION SERVICE will be provided on the Gosford 2 metre repeater (6725) on Saturday afternoon and Sunday morning using the callsign VK2AFY/P.

TRAINS Sydney and Newcastle trains operate frequent services to Wyong Station.

WYONG RACECOURSE is a short five minute walk from Wyong Railway Station.

PARKING Plenty of off street parking is available within Wyong Racecourse grounds.

ACCOMMODATION Accommodation is scarce on the Central Coast at Field Day time, and early booking is advised.

CATERING Tea, coffee and biscuits available from 8.30 am to 3.00 pm at no charge in the Dining Room, Takeaway food can also be purchased with Wyong Racecourse.

CALLS PRESENT Bring your QSL cards for the "CALLS PRESENT" boards.

EXHIBITORS Companies, persons, groups or clubs wishing to set up a traders table or display at the Field Day should contact the Field Day Committee at PO Box 252, Gosford 2250 before 29 January, 1995.

DISPOSALS Disposals lots for the 1995 Field Day will be limited to a minimum lot value of $20. Vendors who wish to sell items of small value are encouraged to sell via the flea market. Forms for Disposals and lot numbers may be obtained in advance by sending a stamped self-addressed business size envelope to -

The Field Day Committee, PO Box 252, Gosford NSW 2250.

Items for disposals may be booked in on Sunday, 26 February between 8.30 am and 10.30 am. Please note that 10.30 am is the cut-off time for disposals booking-in and late arrivals cannot be accepted. Improperly tagged or catalogued items WILL be refused. Because of the new venue of Wyong Racecourse, it will not be possible for items for disposal to be booked in on the Saturday afternoon prior to the Field Day.

Any inconvenience caused by this change is regretted.

FLEA MARKET For those who wish to by-pass disposals and sell their own equipment, trestles will be available and open boot or tailgate sales may be conducted in the Flea Market. Setting up will be available from 8.30 am.

INFORMATION On the Wyong Racecourse venue. Group Concessions, Trade Displays, Flea Market, Disposals. Programs or any other Field Day information can be obtained by writing to The Field Day Committee Central Coast Amateur Radio Club Inc. PO Box 252 Gosford NSW 2250 Phone (043) 40 2500.

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Tired of waiting for packet data? Wish for an easy solution? Now there is one: the PK-96, a cost-effective, high-speed, single-mode data controller.

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SATELLITE TRACKER TO CONTROL YOUR KENPRO 5400/5600 ANTENNA ROTATOR

KR5400 ROTATOR NOW IN STOCK

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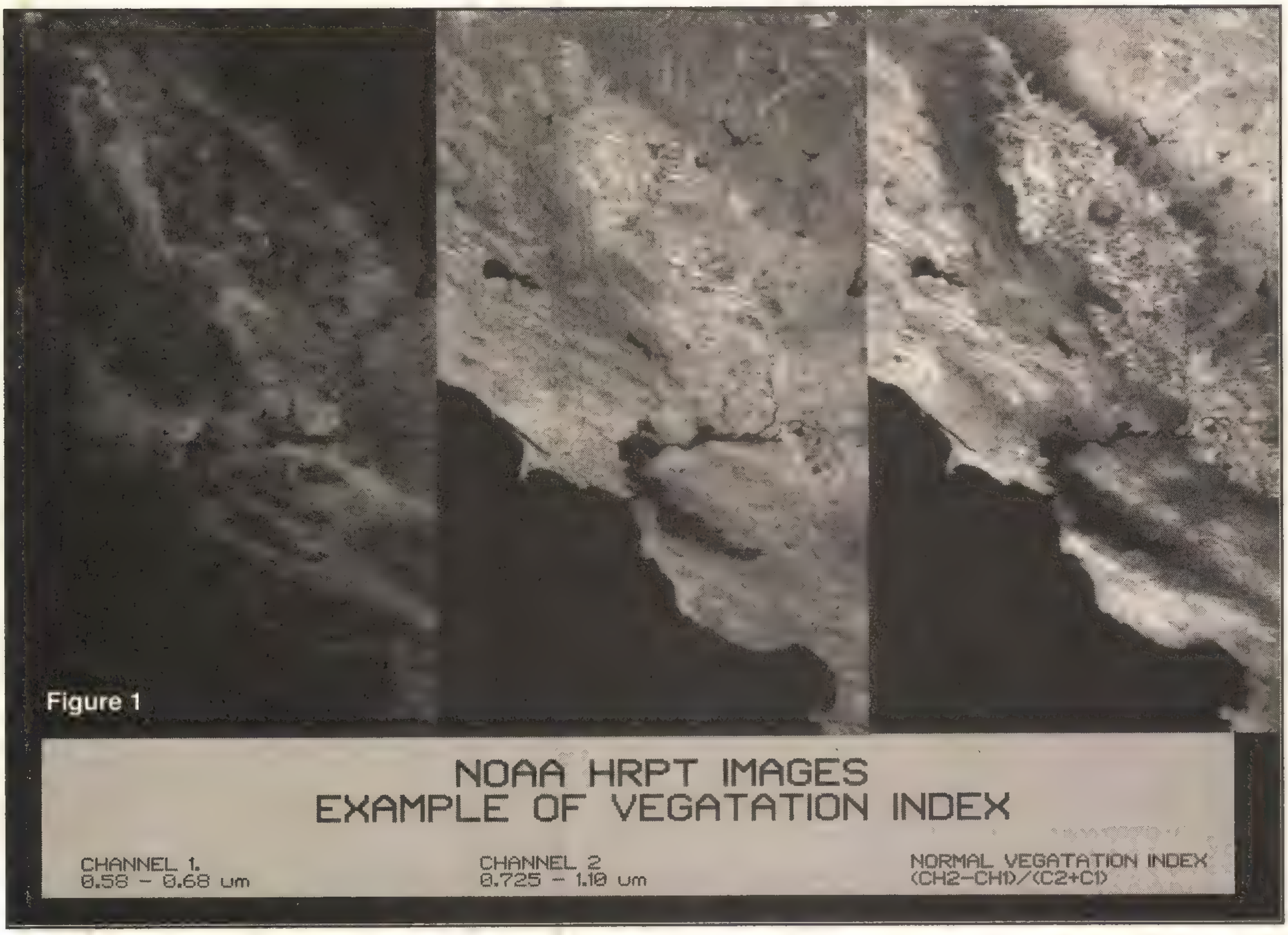


Figure 1

WEATHER SATELLITES & REMOTE IMAGING

By Arthur Andrews, VK2AAE

Over the past few months we have been looking at the Automatic Picture Transmission (APT) mode used to receive pictures from weather satellites. This issue I thought it might be a change to look at the High Resolution Picture Transmission (HRPT) mode which is digital and, consequently, offers far better resolution than the APT mode.

All of the commercial land imaging satellites, such as Landsat, Spot, and so on, use the digital mode to transmit their images, as do the so-called 'spy' satellites. These digitised images are also coded, allowing only authorised users to receive the images. For these they pay *BIG* dollars, and subsequently the images are sold to end users, again for big dollars. I believe there may be 'hackers' who have decoded these signals, but to what success I do not know.

The NOAA series weather satellites also transmit HRPT signals as does the GMS geostationary weather satellite. There is some speculation that the Russian Meteor series also transmits a type of HRPT, but I don't know of anyone who has actually received this type of signal if, in fact, it is being transmitted in the first place.

In the US and Europe there are now systems available on the market to allow enthusiasts to receive and decode the high resolution images from the GOES and METEOSAT geostationary weather satellites. To my knowledge there are no systems on the general market to obtain the high resolution images from GMS, though I believe that Quorum Communications in the US is working on one. The system used by GMS, which is similar to its Northern Hemisphere cousins, is known as Visible and Infrared Spin Scan Radiometer or VISSR for short. It would take a whole article to describe the system fully, but I include here a couple of paragraphs from the GMS handbook which will give you an idea how it works:

"The VISSR is an instrument which ingests visible beam and infrared radiation into a VIS sensor (photomultiplier tube, PMT) and an IR sensor (HgCdTe detector), through a scan mirror, primary mirror and secondary mirror. The visible and infrared signals detected by the sensors are fed to a VISSR Digital Multiplexer (VDM) to be quantised into 64 levels (6 bits) and 256 levels (8 bits) respectively. The VISSR is used to obtain visible and infrared spectrum mappings of the earth and its cloud cover with a specially-designed optical telescope and detector system. The VISSR is a 40.64 cm diameter and 291.3 cm focal length Ritchey-Chretien optical system. It takes about 30 minutes to complete a full earth disk scanning (20° by 20° field of view): west to east the spacecraft rotation of 100 rpm and north to south with VISSR mirror mechanical stepping of 2500 times (140°rad each). Earth disk scanning requires 25 minutes, mirror retrace 2.5

minutes and spacecraft stabilisation 2.5 minutes, a total of 30 minutes in all.

"Imaging by VISSR is performed synchronously with the space craft rotation at 100 rpm. After each rotation of the spacecraft the scan mirror of the VISSR stops and the direction of line of sight moves by 140°rad from North to South. During one rotation the VISSR ingests the data of one line of infrared radiation and four lines of visible beam. It takes about 27.5 minutes to ingest the VIS and IR data in 20° by 20° area including earth disk image, with 2500 forward steps of the scan mirror and its retrace. Imaging swaths are about 5 km per line for infrared and 1.25 km by 4 lines for visible at sub-satellite point. Some of these high-resolution pictures are also converted to APT format for the normal Wefax transmissions."

I won't put you through any more torture like the language in the previous paragraph in relation to receiving high resolution digital pictures from the NOAA satellites, but maybe in the future we will do an in-depth article on HRPT. There are now some very good commercially-made HRPT receiving systems available in the US and European markets, but they are still fairly expensive and probably beyond most people's pockets, including mine. Still, as technology advances the prices come down, so maybe in a couple of years they might become affordable. The big attraction with HRPT is the clarity and resolution of the images, and I have included a couple of examples elsewhere.

In the last article I explained that the NOAA satellite actually images the earth in five spectral bands, two of which are used in the APT images. The whole five bands are transmitted with the HRPT signals giving a wealth of information. NOAA 9 & 11 transmit on 1.707 GHz whilst NOAA 10 & 12 use 1.698 GHz.

An efficient antenna system is required to receive the HRPT signals — either a 90cm to 1.2m dish or a high-gain Yagi. The antenna must also be able to track the satellite across the sky. An az-el rotator connected to satellite-tracking software in the computer is the ultimate, but also the most expensive. Two TV antenna rotators could be used but, of course, would have to have two sets of controllers. Of course there is still the 'arm-strong' method, but this can be fraught with difficulties as mentioned in a previous article.

Depending on the design, the downconverter used for obtaining the signals from GMS may be modified for HRPT reception, but it must have a 3MHz bandwidth. In some cases an LNA may be needed at the antenna. As a general rule of thumb, if you get a good noise-free picture with your downconverter without an external LNA, you should have no trouble in receiving HRPT signals. The signal is then amplified and fed into a phase demodulator.

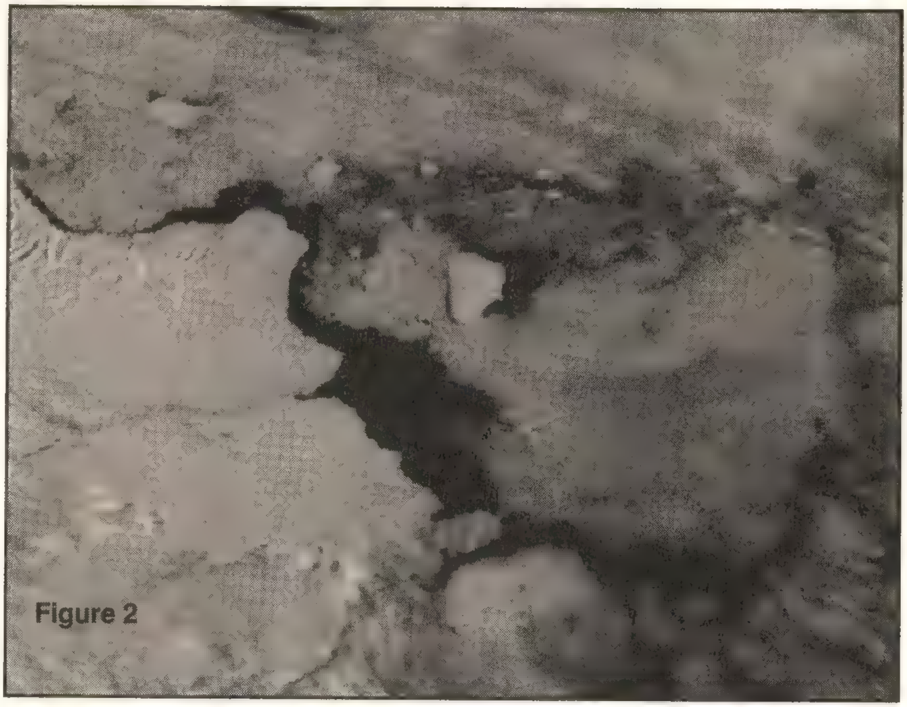


Figure 2

The full description of an HRPT receiving system is beyond the scope of this article, but for experimenters the British Remote Imaging Group's magazine has run articles on do-it-yourself HRPT receiving systems. To store data from all five channels in a single pass could be over 50 Mb and would take a hard disk drive with a slowest speed of no more than 18 mS. You do not, however, have to receive all five channels, and most software systems allow you to choose which channels you want to decode.

As these pictures are of very high resolution they are used by various agencies to study environmental, geographical and climatic conditions.

Figure 1 shows an example of combining two HRPT images (Channel 1 and Channel 2) to give a vegetation index. **Figure 2** shows a HRPT image of the ice flows off the coast of Newfoundland. **Figure 3** (over page) is an example of the high resolution picture transmitted by a commercial satellite.

My thanks to Les VK2BBD for supplying the above pictures originally supplied by WA2WYK, who is a school science teacher in the US.

Review -Wefax Professional Part 2

In the last article I described the amazing receiver/decoder board developed by Quorum Communications Inc, in the USA. When I wrote the last article I had only recently received the board, and had not fully tested all of its features. Having now had the opportunity to fully evaluate this equipment I can only say that it has far exceeded my expectations in performance and ease of operation.

The Qfax software which comes with the Wefax Professional and Explorer receiver/decoder cards is certainly the most advanced package that I have come across. Though it has many features, it is very user friendly and even a computer novice should have no trouble in operating the system.

On entering Qfax you are presented with the Main Menu screen which allows you to set receivers, frequencies and so on as described in the last article. At the bottom of the screen there are the following sub menu choices: Capture, Predict, View, Animate, Set Up, Scheduler and Exit.

In this screen the **Set Up** button allows you to change the board's address settings should it not work with the factory default 300 Hex. Pressing the **Capture** button puts the system into the receive mode for the satellite you have chosen in the configuration choice. **Hfax** (Navfax) can also be received providing you have an external general coverage receiver. You are able to choose between automatic capture (one picture after the other) or manual capture (one picture only). You can also elect to have the pictures automatically stored to file in either GIF, TIF or PCX formats.

....☞

WEATHER SATELLITES & REMOTE IMAGING

(continued from previous page...)

The **Predict** screen is accessed from the main menu and you are initially presented with eight boxes in the capture screen area. These boxes display the current parameters of up to eight orbiting satellites showing satellite name, present latitude and longitude, azimuth and elevation. Below this are shown the time in UTC of the next Acquisition of Signal (AOS) and the amount of time to elapse before its arrival. If the satellite is currently visible these lines would show the time in UTC for the Loss of Signal (LOS) and the amount of time to elapse before this occurs.

The satellites shown in these boxes need not be weather satellites. *Any* orbiting satellite, providing you have the correct Keplerian elements, of course, can be inserted. On the right side of the screen are shown two displays. The bottom, smaller display shows a world map with the current position of the chosen satellites and their predicted paths. Each satellite is represented by a distinctive symbol. Above this display is an enlarged map of Australia showing your location and the paths of the chosen satellites on their next pass. For NOAA satellites the actual area which will be transmitted is also shown.

There are three sub menu buttons for the Predict mode. The ADD button allows you to enter a satellite into a vacant box on the display box screen. The DELETE button allows you to remove a satellite from the display box. The SETUP button allows you to enter your home location latitude and longitude, height above sea level and UTC offset, all of which are important for the tracking software.

Two other items are also important for the accuracy of tracking and subsequent navigation features. The first one is TIME. Your computer clock should be correct to within a few seconds of the actual time. The second one is the satellite Keplerian elements. Surprisingly there is *not* a sub-menu for updating the Kep elements, and this would be my only criticism of the whole system.

To change the Kep elements you can either down load them from a bulletin board direct into the ELEMENTS.DAT file in the Qfax directory, or enter them manually into ELEMENTS.DAT using the DOS Edit feature, which is a pain. I have suggested to Quorum that it would be an idea to have a sub-menu for Kep elements...

The most enjoyable part of the Predict screen is that it is entirely automatic and, providing you have configured the satellites correctly, it will automatically receive the pictures and store them to file together with the ephemeris data relating to that pass. When the satellite comes into view the eight satellite boxes are replaced by the capture screen, and the world map is replaced by the information box for the satellite which is being received. You can then view the picture as it is being received and see the position of the satellite on the local map on the left hand side. This has proved extremely useful when testing antennas.

Pressing the **Animate** button takes you into a simple but very effective animation program. Pictures can either be captured directly into the animation files or transferred from the main graphics file or even from other graphics programs. The animation screen can be set to receive selected satellites only by using the Animation Scheduler. The number of pictures to be animated can be set anywhere between two and 100, allowing very interesting animation sequences especially from GMS.

Besides being able to schedule the times of reception for Animation purposes, by using the Scheduler option in the main menu, all or any of the satellites can be scheduled for reception.

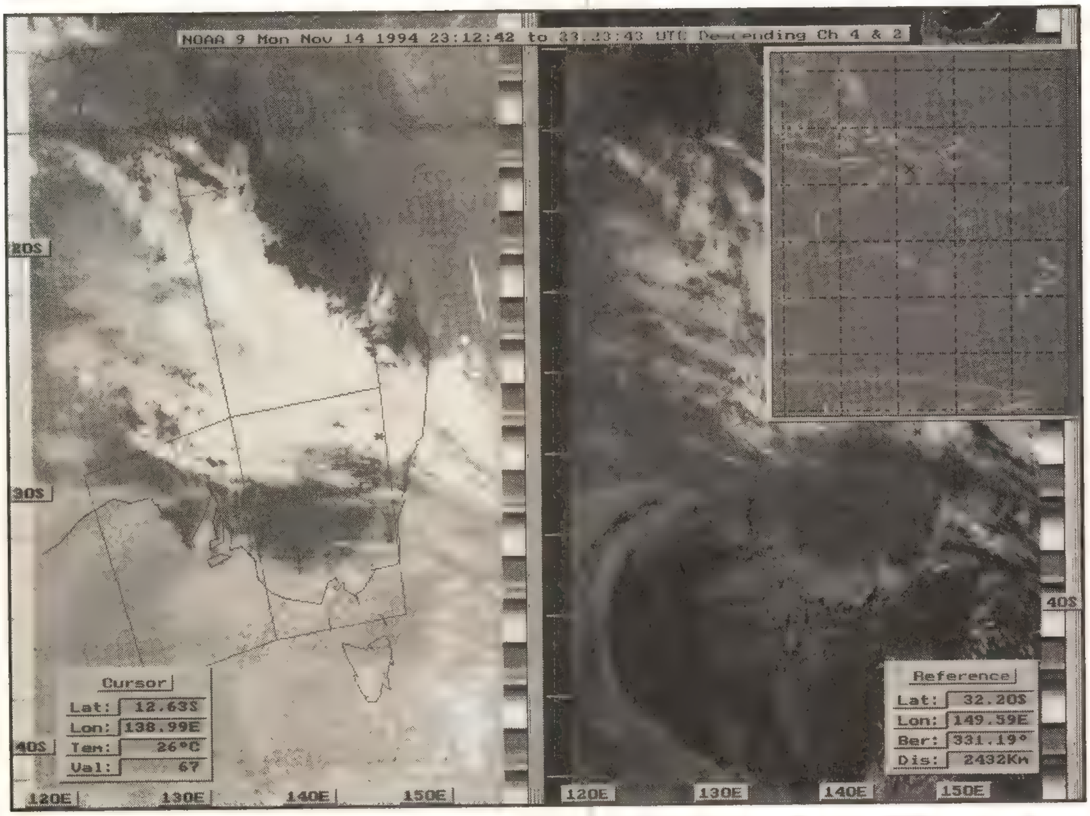
Finally the **View** menu... By pressing the View button you are confronted with a blank screen with various options shown at the top. These are File, Screen, Pan/Zoom, Contrast/Bright, Color, Process and, in the case of NOAA satellites, NOAA. Each one of these menus contains pull down sub menus.

File: Load, Save, Save As (TIF, GIF, PCX, QFX, BMP, JPG, BIN, ANI), Rotate 90°, Rotate 180°, Mirror, Flip, Negative, Align Edge, Print, Printer Setup, Delete, Current File.

Screen: Resolution 640 X 480, 800 X 600, 1024 X 768, 1280 X 1024

Pan/Zoom: Selectable Zoom and Pan parameters.

Figure 3



NOAA 9 Mon Nov 14 1994 23:12:42 to 23:23:43 UTC Descending Ch 4 & 2

Cursor
Lat: 12.63S
Lon: 138.99E
Tem: 26°C
Val: 67

Reference
Lat: 32.20S
Lon: 149.59E
Ber: 331.19°
Dis: 2432Km

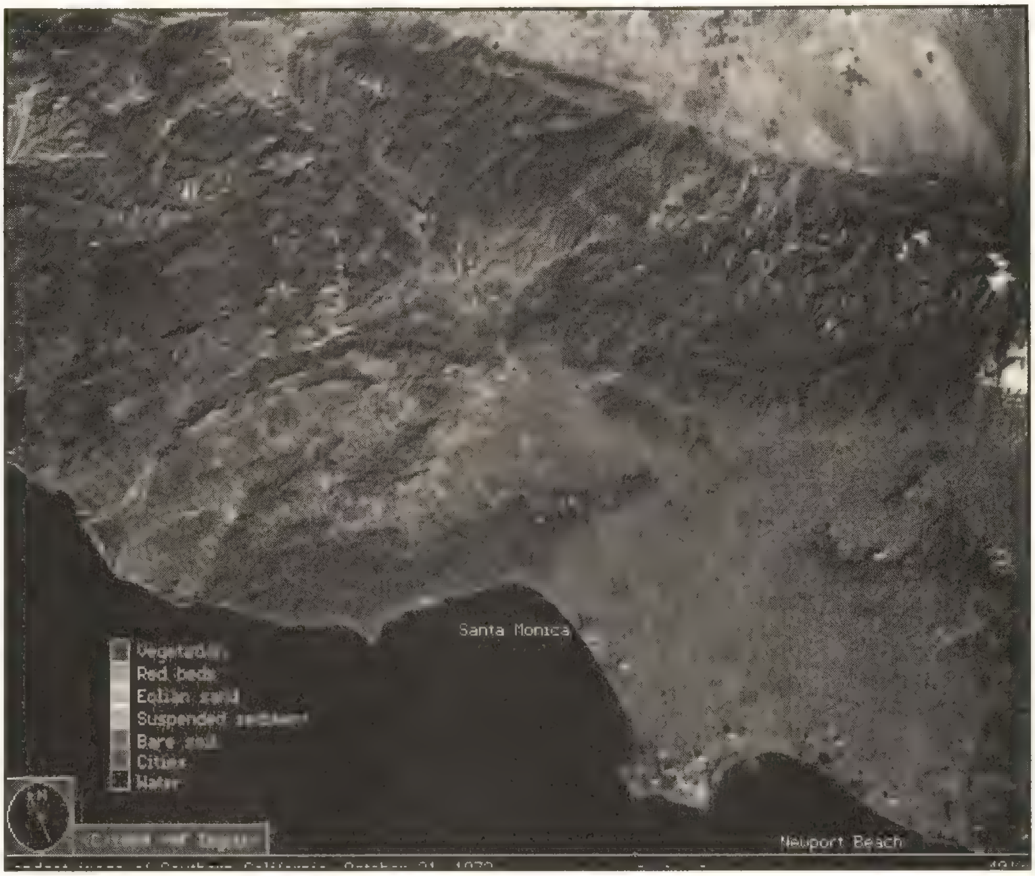


Figure 4 shows an enlarged portion of inland NSW from a NOAA infrared

Contrast/Bright: Histogram, contrast and brightness controls.

Color: Create and adjust own palettes. Load previously defined palettes.

Process: Filters (Smooth, Sharpen, Sharpen Hard, Median and Outline), Negative, NOAA Curve, 3D Effect.

NOAA Images Only: Navigate, (Coast & Country Outlines, Lat/Long Grid, Station Position), Overlays, Tools, (Lat/Long, km/Miles/Nautical Miles, Degrees C, F or K), Swap, Temperature Gradients.

To go through each feature would take far too long, and most of them are self-explanatory in any case, but there are a couple of items which are very interesting both from the educational and practical standpoints.

In the Process menu there is a sub-menu named **NOAA Curve**. These are a series of 12 enhancement curves designed to highlight different sets of meteorological phenomena on infra-red images. These are Hurricane or Typhoon curves, Hurricane or Typhoon Pattern Recognition, Cold Cloud Tops, Terrain 'Hot Spots', Convective Activity, Middle Clouds and Convection, Hydrology Curve, Lower Cloud Levels, All Seasonal Clouds, Coastal Upwelling, Sea Surface Temperature and Lower and Upper Level Clouds.

The advantage of these enhancements can be seen in **Figure 4**, which The image has had the Cold Cloud Tops enhancement applied and, thanks to the filter, it clearly shows a series of thunderstorm cells which hit our area later that evening. Incidentally, the antenna used to capture this picture was a do-it-yourself design by Ron, VK4BRG, which I have been testing for him. The antenna is simple to make and works very well. I am hoping to persuade him to write an article on his design.

Another very useful item is the **Navigate** feature in the NOAA menu, in which country outlines, coastlines and your location can be overlaid on the received image. This is particularly useful on images which have a large amount of cloud cover where the coastline or your location is obscured. On top of this, you can actually measure the distance and bearing of any object of interest in relation to your location.

The usefulness of this feature was demonstrated during last October's bushfire emergency, when we accurately measured the advance of a cold front and its eventual arrival using this feature. **Figure 5** shows a typical picture received from a NOAA satellite in the navigate mode. At the top of the picture is the satellite identification information and which channels were transmitted. The top inset shows the path the satellite took. The small bottom right inset shows my latitude and longitude, and the distance and bearing to the Gulf of Carpentaria. The bottom left inset shows the cursor latitude and longitude, and the temperature at that point. The value refers to the pixel brightness value.

This part of the program will be of great help when tracking cyclones during the coming season. For these features to work correctly the computer clock and Keplerian elements *must* be spot on.

The other interesting feature in the NOAA menu is the **temperature gradient** display. In this, a range of temperatures can be selected, and those temperatures will be displayed as a color slice showing the various temperature gradients. This is useful for studying land, sea and sea current temperatures.

The **Wefax Professional** is aimed at the educational and professional users market and, at around $1712 retail ($1474 tax exempt) it is not cheap, especially as a down-converter and dish will also need to be purchased for GMS reception. Even so, for the serious user it is a versatile and efficient system.

The **Wefax Explorer** has all the attributes of the Professional model, except it does not receive GMS. For orbiting weather satellite reception just connect a suitable antenna and away you go. The Explorer retails for $1275 ($1098 tax exempt). Further details of these systems can be obtained direct from me on (063) 73 4301.

Since I began writing these articles I have received in excess of 150 letters from all over the country, which has been very gratifying.

A lot of people have expressed interest in forming an Australian Remote Imaging Group, but the sheer logistics have daunted me and time is at a premium at the moment. Any ideas or volunteers to setting up such group would be welcome.

My next article will be the last in this series, but I hope to persuade our Editor to have a regular page each month on weather satellites as a normal feature of the magazine.

Cheers for now and thanks to all those who have written.

John Day, VK3ZJF, with some...

ANSWERS SOME QUESTIONS ABOUT PACKET and TNC COUNTERS

Hi, and (as I write) welcome to 1995, a year which will hopefully see many changes in the digital communications world! Before we get back to high speed packet again let's answer a few recent questions.

Scope tuning indicators

For many years the optimal method for tuning radioteletype (RTTY) signals was to use an oscilloscope (CRO). When set up for X-Y operation the output of the MARK tone detector was fed to one input, and the output of the SPACE tone detector was fed to the other. When properly tuned, the display on the screen was very close to a cross, both vertical and horizontal traces being very narrow and clear. Any 'spreading' of the traces or signal appearing outside these vertical and horizontal areas was due to noise or mistuning. Several writers who have become involved in RTTY and AMTOR contesting have written to ask how they can get scope tuning on their multi-mode data controllers.

If memory serves correctly, the AEA PK-232 and PK-232MBX controllers have provision for two outputs to be taken to a CRO. Check your manuals for details. The Kantronics KAM, Enhanced KAM and KAM+ controllers all have a pair of signals which can be routed to otherwise-unused pins on the 25-pin 'D' connector used for the serial interface to the computer. Instructions for making the necessary connections are in the manuals. But if you are uncertain, then contact your dealer who will have the necessary changes carried out for you.

MFJ have included provision in the MFJ1278B controllers for a small interface unit to be added inside the controller to bring out the necessary signals for the CRO. The add-on indicator unit is known as the MFJ44 and is available from the importer, DAYCOM Communications. For the MFJ1278 and other controllers, the MFJ44X is a small external unit which performs the same function.

My understanding is that just about *any* HF modem design can have the MFJ44X interfaced to it to permit the attachment of a CRO for alignment and tuning purposes.

HF tone frequencies

Several other writers have asked for clarification on the actual tone frequencies used for HF operation in Packet as well as AMTOR, PacTOR and G-Tor operation.

This is actually a curly one, as several different standards exist in different parts of the world! To come up with sensible suggestions, let's look at a bit of history...

In the days of HF RTTY operation, two basic standards emerged, one for use on normal HF systems — tones of 2125Hz and 2295Hz (170Hz shift) and the other common on VHF with tones of 2125Hz and 2975Hz (850Hz shift).

More recently, we have seen the introduction of a 200Hz shift, usually 2110Hz and 2310Hz, particularly from Europe and in many modern American products. Then with the introduction of packet operation at 300bps we also saw the use of 1600Hz and 1800Hz as the common tone pair for that mode.

Why the changes?

Well, there are very good reasons. When packet was introduced, operating at 300bps on HF, many users found that the upper reaches of the modulation sidebands of the 300bps signal were either too close to, or beyond, the edges of the passband of the IF filter in their radios. Many of the modem chips they used offered 1600/1800Hz as an alternative. When using this pair the filter characteristics are usually far more amenable to digital mode operation.

For some years we have gone along using whatever our equipment had set up as a default, usually without knowing what it was. Some controllers are now using 170Hz shift 2125/2295Hz and others 200Hz shift 1600/1800Hz. So why the questions arising now? Well, some questions have arisen before, particularly when people wanted to use the FSK facilities of their transceiver! But now the questions generally relate to the increasing use of Digital Signal Processing units (DSP) between the radio and the data controller. With the introduction of the Timewave Technology DSP-9+ and DSP-59+ as well as the MFJ784 and others, we now have DSP units designed with optimised filters for HF digital modes. The Timewave units both have a wide range of tone pair selections, but others do not... thus we have confusion.

My suggestion, for what it's worth, is to check the manual for your data controller to see what tones it uses. Some, like the KAM and KAM+, can have different tone frequencies set under computer control. Others can't. Then check that whatever DSP unit you propose to purchase supports at least the tone pairs you need. Good luck!

Health counters

A few days ago I got a message asking about the health counters in most TNCs. Have you ever come across them? Quite possibly not, as the user rarely needs access to the figures contained therein.

Basically, the developers of most firmware bury bits of troubleshooting code in their products to use when debugging code or for checking how well their products work.

Although most packet users will never need to look at them, they can be fun, if you know what they mean. Sometimes when you contact your TNC supplier you may be asked to read the value of one of these counters.

Here are some of them and what they mean:

ASYFRERR: Indicates the number of characters received from the computer which have framing errors. If this count increases you are having problems with the serial communications to the computer.

You may need to check for noisy cables or for flow control problems.

ASYQOVER: This counter increases when the TNC's input buffer gets overloaded by the computer. Generally, this means data is getting lost! Usually, the computer (or the software) is not responding to the flow control signals from the TNC.

BBFAILED: A count >0 indicates that the bbRAM (battery backed up RAM) has checksum errors. You may have a faulty RAM chip, RF feedback or a flat battery.

DIGISENT: Indicates the number of frames (packets) digipeated by the TNC. This gives you a count of how many frames you are digipeating for other people!

RCVDFRMR: Increases when frame reject frames are received from a connected station. This usually indicates problems. FRMR frames should be rare and often indicate slightly incompatible versions of AX.25 are in use or that one or other TNC is not totally compliant to the specification.

RCVDIFRA: Counts the number of received 'I' or Information Frames you've had from the station you are connected to — basically, then, how much data you have received.

RCVDREJ: Gives the number of frames you sent which were rejected by the other station, for whatever reason. Read the AX.25 protocol to understand why REJ frames occur.

RCVDRNR: Counts the number of RNR (Receiver Not Ready) frames from the station you are connected to. These frames are a normal way of signalling when the TNC is processing data and wants a short break! This counter often gets *very* large.

RCVDSABM: Records the number of SABM (Set Asynchronous Balanced Mode) or CONNECT request frames received which are addressed to this TNC.

RXCOUNT: Increases each time a valid frame is received. These frames may be data (I) frames or supervisory frames of some sort.

RXERRORS: Counts the number of frames which are thrown out for *any* reason in the receive decoding process. If you are running with open squelch then this count can get very high.

RXLENERR: Indicates the number of times a frame has a length error which results in the TNC getting temporarily confused. In older TNC firmware, this often resulted in a TNC locking up.

RXRESYNC: Indicates the number of times the TNC has recovered from RXLENERR errors.

SENTFRMR: The number of frame reject frames you have sent. You may want to refer to the AX.25 specification if you send a lot of FRMR frames to others connecting to you.

SENTIFRA: A count of the number of I frames you send (see RCVRIFRA also).

SENTREJ: Increments whenever a REJ frame is sent. On busy or crowded channels this count can get high.

SENTRNR: A count of the number of times you have asked the other station to wait.

That's enough for another month. See you next time de John, vk3zjf@vk3blw.

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The Diary of Larry Toff Alias 'The Last Two'

YL FORUM......By Kirsti Jenkins-Smith, VK9NL....

Monday: After months of studying and Morse practise I have finally made it through the eye of the needle. My amateur radio license arrived in this morning's mail and I am all set to join the 'big guns' on 20 metres SSB with my brand new call VK*&YZ.

Of course, the VK is only there to tell the world that I am located in Australia and the * pinpoints me to my state. But it is the &YZ which interests me personally. When I listen around on the bands I can hear the real smart operators effortlessly dropping just the last two letters of their calls into a pile-up. It sounds awfully swish, so that's what I am planning to do. I could almost be professional, like a disk jockey on one of the local MF or FM stations. They never ever use their prefix!

Tuesday: I had such *fun* when I opened up last night with my YZ call. There I was yelling "Yankee Zulu, Yankee Zulu*uuu*!!" in a big pileup. Of course, there was an old fossil sitting on the sideline grumbling something about "don't you have a callsign?!". I could hardly believe my ears. Of *course* I have a callsign and I was using it to the best of my ability. It sounded ever so professional, even cute.

Surely nobody can fail to realise that YZ actually means VK*&YZ. There can't be *that* many YZs around. And the DX did come back to me, so there! He was a bit waffly though. "YZ," he said, "You're five-nine and I'm happy to work you in Venezuela with your special prefix. Are you on an island?" It really threw me there for a bit. Venezuela? Island? What was the silly geezer talking about?

He then went on to say "YZ, are you still there? Give me the rest of your call. It is all computer logging at this end and I am waiting to fill in the suffix." So I told him that my full call was VK*&YZ and I must admit I felt a bit of a fool doing so. "But YZ will do," I added, just to get into the swing of things again. He was obviously on the same wavelength, because he came right back to me and said that okay he would put me down as YZ as that would save him having to delete and start my call again on the computer. A real humdinger!

Wednesday: Last night as I was tuning around 20 metres I came upon a net where everyone was busy checking in, using only 'the last two'. Now here are the *real* pro's, I thought to myself. No mucking around with cumbersome callsigns.

I dropped my YZ into the babble and was almost immediately picked up by the unidentified net controller whom I will just call UID (for UN-ID) hi, hi. Anyway the UID told us all to stand by because soon the DX HE would appear on the frequency. When HE finally showed up, the UID told us all to only use our last two to call HIM and not to use HIS callsign at all. Which made it real easy for me because I did not know HIS call anyway.

When the UID called for YZ to make my call, I and a couple of other guys who also happened to be YZs called together. And we could all hear HIM confirming that YZ was 59 in the log. I was really pleased about the smooth operation.

To work a few fellows simultaneously surely is top of the heap. Real bulk billing, I thought, I being a man of the world. I'll soon have my DXCC hanging on the wall. The CQWW contest is coming up this weekend and that will bring *lots* of rare ones.

Friday: Last night when I was on the band a VK station called me and told me I ought to use my full call. What cheek! I told him that it was too amateurish and guess what he said — he said I should not confuse 'amateur' with 'amateurish'! "'Amateur' only means that we are not paid wages," he said. "It does not mean that we don't have operating standards."

What a stupid statement. "Listen to the professionals," I had to tell him. "Listen to the disk jockeys," I said.

But he just kept on about standards and procedures and pride in our hobby. He even tried to tell me that overseas amateurs would not know where I was located unless I identified with my full call. Such rot! There is only *one* Larry Toff!

Monday: I had a real fun weekend with the contest. Worked some really rare ones. Especially one country which is *so* rare that its prefix does not even feature in the DXCC countries list. Its full call was QRZ and I gave it all I had of power to break the pileup and make the QSO.

It did not take long. "YZ, you're five-nine QRZ?" he said. Wow! It must have been a special DXpedition or something because I heard several QRZs up and down the band. And then there was one silly fool who was chewed out good and proper because he was already in the log. What a lid, I thought. Why would he want to work QRZ twice when everyone *knows* about duplicate QSOs in contests.

Anyway, I reckon I have about 50 countries worked after just one week. At this rate I should be top of Honour Roll in less than six weeks time. But first I'll have to send off QSL cards. The bands are dead tonight so I have decided to QSL my whole log and get all the cards off to the buro first thing in the morning.

Tuesday: It is now six months since I sent my cards off to the buro, but I have not had any cards back. Oh, well we know what these DX stations are like. Money-grabbing, dishonest, lazy, no good so and so's. I may try to QSL some of the extra rare ones direct, just to see what will happen.

Friday: It is now two weeks since I QSLed Ethiopia direct. And guess what? I got a card from him today. Trouble is the old timer down the road has told me it won't be any good for DXCC. It is made out to YZ, you see. I can't believe that the DX station could be so stupid.

Tuesday: I have studied that Ethiopia card closely, to try to find where it says VK*&YZ. I can't see any such thing, but I did find the small print in the top right-hand corner of the card. It says "The operator is a member of the Organisation Against the Last Two. (OALT)". Well, of all the dirty tricks, this takes the cake! I wonder if there are many members in OALT.

Thursday: Spent yesterday just listening around. Have discovered that the ones who have made it in DXing and the ones who are well known on the bands, all use their full calls all the time. I have also found out that there is no such country as QRZ. The card was returned to me from the buro along with a dozen or so that I had made out to HE, and Harry and Dave and Pete, along with a few others. I don't think the buro is all it is cracked up to be because these are the only cards I have had back from them so far. And now I haven't got a clue who I worked in the contest back in October or who some of the ones I have worked on the UID net are. So maybe speed is not always of the essence after all.

I have done a lot of thinking lately and I have decided that I am going to change my operating habits. Actually, I think that old VK who tried to talk to me when I first started out in amateur radio was right. Standards beat speed hands down.

Sunday: I had such a fun weekend. There I was, calling with my full call and the Europeans went crazy. They all wanted to talk to me because apparently in Europe, Australia is quite rare. The 'Last Two'-ers don't know what they are missing out on. Now that I listen to them I can hear how witless it sounds. Thank goodness I was saved by the OALT before it was too late.

Monday: Sent off my application for membership in OALT today...

About Six...By Steve Gregory, VK3OT...

Happy New Year!

A recent submission made to the SMA by the WIA carried the following requests:

- That 50.000 to 50.050 MHz be allocated for CW and beacon use, with no change in power.
- That 50.200 to 50.300 MHz be allocated for domestic and beacon transmissions using CW/SSB.
- That the RTTY mode be added to the two other modes for 50 MHz SSB/CW.
- That the power level for RTTY be equivalent to 100 watts py (30 watts).
- That 50.300 to 50.500 MHz be allocated on a low-power allocation basis.

There was no request for an increase in the radial distance of operation or a power increase, on the basis that it could not be justified due to the protection ratio required for Channel 0 services.

A request was made to expedite the clearing of Channel 0s from the band. In the past five years, only low-power translators had gone off the air.

Severe interference has been caused to Channel 0 services from Asian and New Zealand TV services.

Frankly, it is time to shift them up to UHF. This will not be easy due to the desire to cover as much area as possible — such as the western plains of NSW and the Darling Downs of QLD by low-band TV.

We should have an announcement soon on how the proposal was received by the SMA.

Cultivate a friend in Antarctica...

If just *one* of the following could be enticed up onto 50 MHz, the scarcity of VK0 contacts could be reduced...

4K1J	Novolazarevskaya — Princess Astris Coast
8J1RL	Nipr Syowa — Ongul Island
AT3D	Maitree Station — Princess Astrid Coast
CE3MFJ	Eduardo Frei Moltava — King George Island
CE9AP	Capitan Arturo Prat — Greenwich Island
CE9OH	Bernardo O'Higgins — Peninsule Palmer
DP1KGI	George Von Neumayer 1 — Princess Martha Coast
HF0POL	Arctowskiego — King George Island
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LU1ZC	Des. Nav. Deception — Deception Island
LU4ZS	Bas Vicecomodoro Marambio — Seymour Island
OA0MP	Macchu Picchu Base — King George Island
VI0ANT	Davis Base
VK0ERZ	Lances, VK7ERZ.
VK0FPS	Phil, VK4FPS.
VK0IX	Darin, Casey Base.
VP8CMR	Base 'Z' Bas Halley — Reine Maud Land
VP8GAV	Base 'KG' Bas Fossil Bluff — Alexander Island
ZX0ECF	Commandante Ferraz — King George Island

73 de Massimo, IK1GPG @ IW1BIM.

10GHz records fall

A new record was set for the 3cm band on Sunday December 11, 1994, when Trevor, **VK5NC** operating portable at Cape Banks, SA and **VK3ZQB** at Moonlight Head near Cape Otway in VK3, set a new distance record for VK3 of 267.6km.

On Monday, December 12, 1994, VK5NY on Mt Magnificent, VK5NC at Mt Gambier and VK3ZQB at Port Fairy operated on 3cm SSB.

First, VK5NC contacted VK5NY from Mt Gambier on 3cm with 5-9 signals. Trevor later moved to Nelson in Victoria and re-established communications with Roger VK5NY.

This contact broke the previous VK3 record set by VK5NC and VK3ZQB, as well as setting a new VK5 distance record. Later VK3ZQB was successful in contacting Roger VK5NY from Port Fairy Victoria, breaking both the VK5 and VK3 distance records as well as setting a new national record.

The distance worked was in excess of 460km.

Equipment used was a DB6NT transverter with an output of 150mW into a 600mm dish.

VK5NC constructed both his and VK3ZQB's transverter. Trevor used an Icom IC-202 as the IF transceiver, while VK3ZQB used a home-brew two metre SSB transceiver from an NZART design. VK5NY used a similar set-up.

QSP QSP QSP

This is just a short message to let you know that **VK3RUG-6**, operating on 53.100 MHz, has been in operation for around six months and could accommodate more users.

It is a packet radio digipeater tied to VK3RUG-2 on 147.600 MHz. We have turned the CW ident on for six metres, and this signs VK3RUG every five minutes using FSK.

VK3RUG is located between Alexandra and Lake Eildon, 650 metres ASL, running 25 watts into a vertical with an omni-directional pattern.

73 from Peter, for the Six Metre Repeater Group.

A report from VK3AMX

There were good conditions over the last week in November on the band, with very watchable TV from NZ channel 1 and Toowoomba channel 0 at different times.

I get plenty of tropo into N/W Tassie, but seldom hear the Hobart beacon on 52 MHz (though it was in with excellent sigs the other day for an hour or two), and have *never* heard channel 0 down there. (46.2410 MHz Pete).

I can't check channel 2 in Tassie here, because of Mt Dandenong 10 km. away. I haven't yet heard VK3SIX on 50 MHz, since it was turned south. I'll listen for it on B/S and will report if I log it. I haven't been hearing it on 10 metres either.

See you on the magic band. 73 from Pete, VK3AMX (P29CW/WA6VDF) @ VK3KSD.#MEL.VIC.AUS.OC

Report for Boxing Day

The band opened to New Zealand at 2200z with strong signals from TV on video and audio frequencies. Callsigns and beacons logged were:

ZLs 2TPY, 2KT, 2UJH, 2MQ, 3NE, 3NW, 3TY, 3TLG, 3TIB, 3AAU, 1THQ and 1AXB. VKs 3DTO, 3XQ, 3DUT, 3DUQ, 3ATQ, 4DO, 4BRG, 4EZ, VK7FP, 7GUN, 5BOK, 6AO and 6HK.

VK2RSY/B 28.261 MHz from 0100z until 0400z:

VK3SIX/B 28.253 MHz from 0130z until 0300z backscatter from South.

VK3SIX/B 50.053 MHz from 0200z until 0230z backscatter from South by ZL2KT.

VK4ABP/B 52.345 MHz from 0040z until 0100z:

VK4BRG/B 50.076 MHz from 0040z until 0000z:

VK6RPH/B 50.066 MHz from 0650z until 0700z:

VK7RNW/B 50.057 MHz from 0830z tropo and backscatter.

VK7RST/B 52.370 MHz from 0300z until 0330z by short skip.

ZL2MHB/B 28.230 MHz from 0115z until 0800z:

ZL2MHB/B 51.028 MHz from 0030z until 0400z:

ZL3MHF/B 50.043 MHz from 2300z until 0900z:

ZL4AAA/B 50.097 MHz from 0030z until 0300z:

VK6 report

The following information comes from VK6RO with supplementary comments by VK3OT:

Dec 5:
0100z VK6RWA 28.264 MHz beacon.
0200z VK6ZHA, VK6AS.

Dec 12:
0013z 45.240, 45.250 MHz video.
0855z 57.250 MHz video.

Dec 13:
0735z 57.250 MHz TV, VK5VF/B 52.450 MHz.
0820z 46.171, 46.240, 45.240, 45.260, 51.740 MHz sound and VK4 propagation.

Dec 14:
Open from 0325z but no contacts.

Six metre DX records

Cycle 22 saw *every* six metre DX record broken from *every* state of Australia.

VK1RX worked **KP4A** on April 8, 1991 at 16,082 km.

VK2FLR worked Joel **N6AMG/CU3** on Nov 27, 1991 at 19,424 km.

VK3OT increased his personal best to

16,924 km when working **GW3MFY** on 19/2/91.

VK4KK worked **G4CCZ** at 16,515 km on 15/2/92.

VK5NC set a new VK5 record when working Geoff, **GJ4ICD** on 18/10/91 at 16,808 km.

VK6RO worked **GI8DYZ** on 28/2/90 at 14,904 km.

VK7IK worked **PA0LSB** on 8/2/92 at 17,053 km.

VK8RH worked **8R1AH** on 2/4/89 at 18,858 km.

VK2BBR set a new digital mode with **JH1WHS** on 28/4/91.

VK4ZAZ made a long distance mobile contact to **FM5WD** at 16,243 on 6/4/91.

VK3OT made the first-ever six metre EME contacts on 7/11/93 with **K6QXY** and **W6JKV**.

There are four contentious long path records with which some disagree: These are **VK2BA** and **VK3OT** to **9Q5EE**, **TL8MB** to **VK6JQ** in the 26 to 28,000 km class and **9L1US** to **VK4ZAZ** at 22,550 km.

VK3LK, **VK3OT** and **VK5NC** all worked the continent of Antarctica for world first contacts.

VK3OT and **VK5NC** are the only stations in the world ever to have worked all seven continents on 50 MHz.

This could have been changed if **K6MYC/KC4** had been successful or if **VK0IX** gets up and running before next December.

News á la carte...

• Mike, **VE9AA** writes about the trans-Atlantic openings during the short winter Es season in Dec/Jan: "A few CT/EA/EA8/ZB2 beacons have been heard in Canada, but no live ops. I just got my new IC-736 and would like to know of modifications to enable reception between 30 and 45 MHz. 73 de Mike VE9AA @VE9VT.NB.CAN.NA

• Arne, SM7AED received this letter from Stefan, **LA0BY**: "I am not QRV on 6m from JW yet, but plan to set up a beacon from next year.

The frequency will be 50.047 MHz, with at least 10 watts into a 2-4 element Yagi beaming 340°.

The beacon should contribute to propagation studies over the North Pole. VE8EV (CP38) and OH2TI (KP20) will also participate. If I should be on JW during next summer I will certainly have some equipment for 6m. For the moment priority is given to 2m EME..."

• **Major meteor showers.** Arne, SM7AED has supplied the following OH5IY material: Meteor shower maxima were The Geminids: December 14, 04 UT. The Ursids: December 22, 18 UT. The Quadrantids: January 03, 23 UT.

K6MYC update...

EME was scheduled between 1400z and 1800z from December 24 to 31.

Es was also scheduled, from 0500z to 0800z each day, on 50.110 and 50.125 MHz, with a beacon 50.100 MHz.

With the 144 MHz EME, the idea was to transmit on 144.080 MHz, and receive on 144.082 MHz.

There was a one-minute sequence, with K6MYC/KC4 to transmit on the odd minute.

During the 1400z window on Boxing Day, several W4/W8 stations were heard on 14.345 MHz commenting that no 2M signals had been observed. The equipment did not arrive as scheduled due to delays at Los Angeles' international airport, LAX.

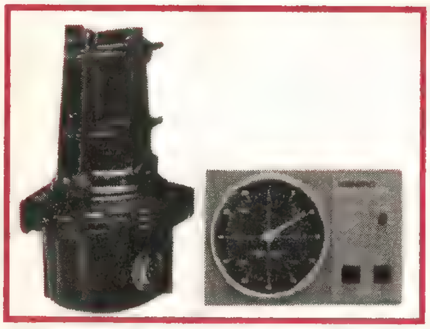
The beacon used a wire beam and a Kenwood TS-60S on 50.100 MHz.

There were no ops on Dec 31/Jan 1 due to solar noise, but there were many stations looking for any Es over the 2800 mile/4500 km path.

Ray, ZL2KT reported that VK3SIX beacon signals were audible from the south and the VK3SIX 28 MHz beacon was also noted on backscatter.

Good luck all, and maybe we'll meet in the next issue — but maybe I'll be on my way to spend a couple of years teaching in the United Arab Emirates, which would cause me to give the game away. One never knows...

*Thanks to **VK3ZQB, VK3ATQ, ZL2KT, ZL2TPY, ZL4AAA, W6JKV, VK6RO, K6MYC, K6QXY**, the **OZ DX Bulletin**, **VK5PO**.*



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HERE and THERE IN AMATEUR RADIO...by Paul Butler, VK3DBP

JVFAX, SUN SPOTS, AND OTHER THINGS OF INTEREST

Welcome again to Here and There, the regular ARA column which looks at all aspects of amateur radio. For the items in this column, we rely on readers letting us know what's happening, what's new and what's interesting to YOU. Why not drop us a line and fill us in on your particular interests in the wide world of amateur radio?

One reader who **did get in touch this month was Bob Barnes, VK2RCS. Bob runs RCS Radio** in Bexley, NSW, which was established way back in 1933 as the first Australian company making printed circuit boards commercially.

He dropped a line to Here and There to let us know that RCS produces a printed circuit board for the simple interface many of us use with JVFAX, the top-class fax and slow-scan television (SSTV) computer program.

JVFAX has been reviewed in several of its more recent versions in ARA over the last year or two. Most recently, JVFAX 7.0 was released to widespread acclaim, and it offers an excellent way into SSTV and the other digital picture modes.

Software at no cost, like JVFAX, should be supported by hardware which costs as little as possible, so a simple interface design is included with the documentation for the program.

The interface connects the audio output of the receiver to the computer's serial port via a 741 integrated circuit; an analogue SSTV or fax signal is then presented to the digital circuitry of the computer and the software gets the picture up onto the screen.

On the transmit side, the computer speaker is connected by a simple filter to the microphone input and the software generates the right audio tones for transmission.

An added bonus is that the serial port can be used to operate the press-to-talk (PTT) line on the transmitter, too, making operation very simple.

When I first got JVFAX going, I wired the 741 and its few associated components into the pins of the DB25 plug which goes into the RS-232 socket on the computer (it is possible to use a DB9 plug instead if that's the kind of serial port on the computer).

Because the computer generates so much radio- frequency (RF) hash, however, it was not long before I arranged the circuitry a little more tidily into a metal box which provides an effective RF screen.

Bob's neat printed circuit board would make this process a breeze.

Component layout is provided for the input circuit, built around the 741 chip, the output filter and the PTT connection. RCS includes in its packaging a component layout diagram, a copy of the printed tracks themselves and a full circuit diagram and component list.

The suggestion is made in this documentation that the Dick Smith Electronics jiffy box, listed in the catalogue as UB5/H-2855, is suitable for boxing up the interface.

This, however, is plastic, apart from the lid, and would not provide as effective a screen to RF hash as an all-metal box.

Consider as an alternative, then, one of the diecast aluminium boxes available from DSE. I used the 100 X 25 X 50 mm size listed as H-2221.

Thanks, Bob, for getting in touch with Here and There.

You can write to Bob at RCS Radio, 651 Forest Road, Bexley NSW 2207, fax him on (02) 587 5385 or speak to him on (02) 587 3491.

Next in Here and There this month — what do you do when the sun-spots go away...?

One of the great things about amateur radio is that there are many, many different aspects to the hobby.

Some amateurs chase DX (long-distance contacts), others bounce signals from the moon.

For many, Morse Code is the ultimate form of communication; for others, speech is the way to go, or pictures via slow-scan or fax, or text via packet or radio-teletype.

Some amateurs buy their gear, others makes every last bit. There is no right or wrong way in amateur radio — if you have a particular area of interest or expertise, go for it and you'll probably find someone else with the same interest.

There is no doubt, however, that the hobby of amateur radio is tied up in some way with the sunspot cycle, that natural phenomenon which, every 11 years or so, does a Clearasil and wipes the face of the sun clean of spots.

This inexorable cycle leaves many of the HF bands silent and many amateur radio operators in a bored and depressed mood!

The dark areas we see from Earth as sunspots are patches of the sun's surface which are in turmoil and, as a result, are slightly cooler than the surrounding areas.

Sunspots spew out heaps of charged particles and electromagnetic radiation, a proportion of which arrive at the Earth and well and truly stir up the ionosphere.

In its agitated state, the ionosphere helps our HF communication by bending signals back to Earth rather than letting them escape into space. This means, however, that when there are no sunspots, HF propagation is truly woeful.

So what *do* we do when the sunspots go away? Well, here are a few ideas from Here and There, some serious, others not so.

If you have your own effective ways of surviving the sunspot minimum, let us know — you may save a fellow amateur from total boredom and despair.

• The Optimistic Approach — carry on as usual.

"Sunspots?", say many of our fellow amateurs.

For them, the 11-year cycle has no relevance. These may be the amateurs who frequent the higher bands, two metres and above, where propagation is determined by many factors but *not* sunspots and their effect on the ionosphere.

The more serious among them look for other seasonal and cyclical phenomena, such as tropospheric ducting or sporadic E.

Even the repeater dwellers, though, are immune from sunspot maxima and minima; line of sight is enough.

And this includes the packet crowd as well, who operate on two metres or 70 cm, and for whom the sunspot minimum may be something they read about while preparing for the exam!

Or they may be members of that band of HF stalwarts (great word) who seem to find enough DX at any time of the cycle to put reports into the pages of ARA and similar magazines.

A tolerance for weak signals, infinite patience and an intimate knowledge of where and when to look for DX all help, of course.

These amateurs are really onto something, you know.

They certainly do not throw up their hands in despair every time the sunspot minimum comes around (which we know it will).

But even those of us who are not DX-busters will often find something going on in our favorite bit of amateur radio; it might just take a bit more effort, that's all.

For example, my favorite haunt at the moment, 14.230 MHz, is where the slow-scan TV enthusiasts meet. And quite often in recent times I hear, "Conditions have been terrible lately.

Things are *so* quiet." Yet signals *are* around and pictures *do* come in. Time and again, the band seems quiet. But put out a brief CQ and the gang appears — everyone was just waiting for everyone else to put out a signal!

So, be optimistic. Carry on as usual, knowing that things can only get better.

• The Pessimistic Approach — take up another hobby.

There are certainly amateurs who disappear from the bands for a few years, at times which coincide with sunspot minima.

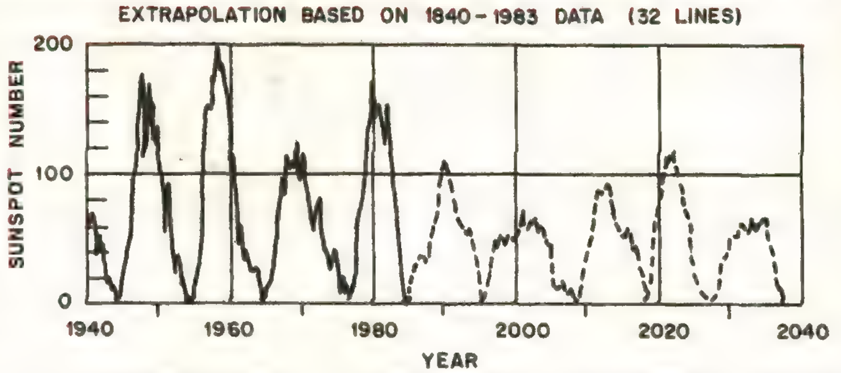
Perhaps they join in family life more than during the maxima ("Hi, Dad! Where have you been for the last five years?") or get to know their partner better — is there an 11-year cycle in amateur population growth?

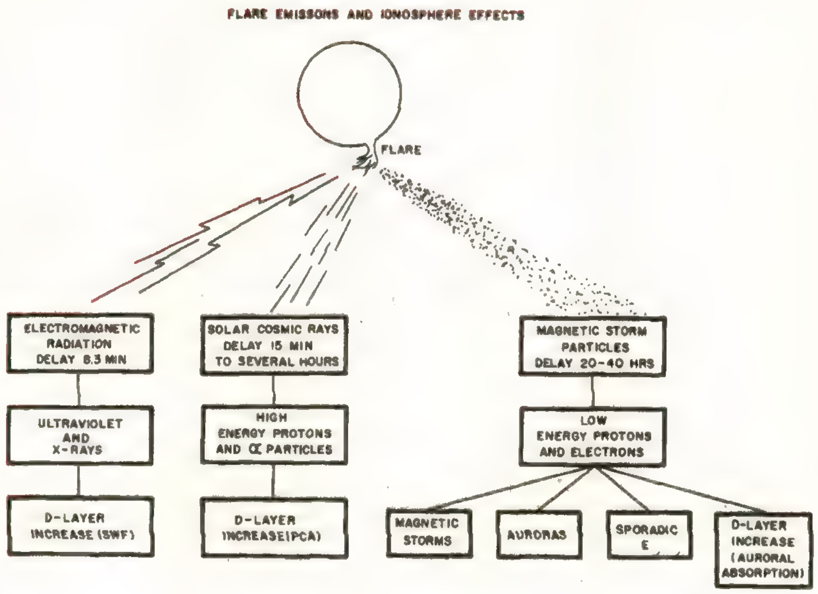
Or perhaps they have found an interest which really takes off during a sunspot minimum.

They may, for example, be trying to make radio contact with extra-terrestrial lifeforms — the signals must surely pass more easily through the ionosphere when it is quiescent.

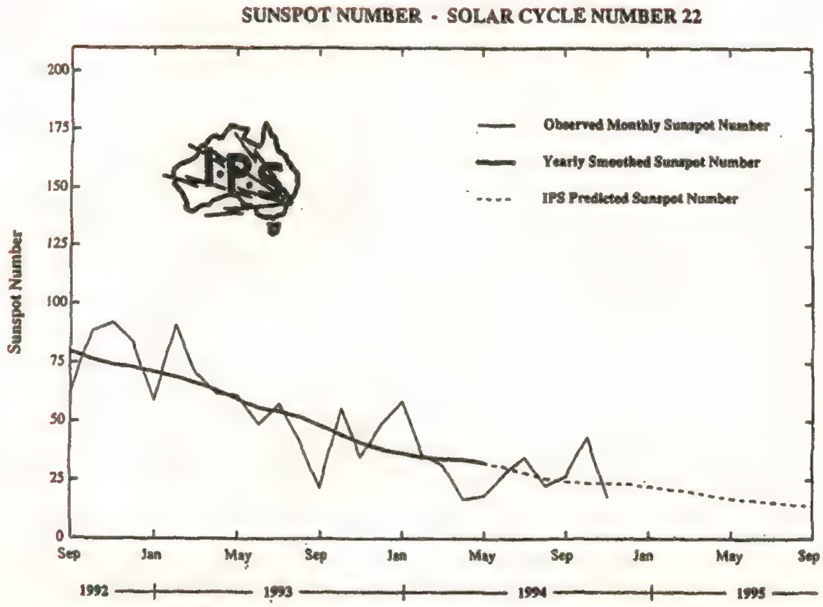
This would, of course, represent the ultimate DX and success would demand an instant revision of the DXCC listing!

....☞




FLARE EMISSONS AND IONOSPHERE EFFECTS
FLARE
ELECTROMAGNETIC RADIATION DELAY 8.3 MIN
SOLAR COSMIC RAYS DELAY 15 MIN TO SEVERAL HOURS
MAGNETIC STORM PARTICLES DELAY 20-40 HRS
ULTRAVIOLET AND X-RAYS
HIGH ENERGY PROTONS AND α PARTICLES
LOW ENERGY PROTONS AND ELECTRONS
D-LAYER INCREASE (SWF)
D-LAYER INCREASE(PCA)
MAGNETIC STORMS
AURORAS
SPORADIC E
D-LAYER INCREASE (AURORAL ABSORPTION)

A summary of solar flare emissions and ionospheric effects.



Anyway, if you must be a pessimist, make sure you're back in time for the next maximum. And don't give up your subscription to ARA.

• The Creative Approach — build something.

This is the amateur radio equivalent of sitting in front of a log-fire in winter with a whole heap of bulb and seed catalogues, planning the spring gardening.

Get out the soldering iron, the components box and a good book or two of circuit ideas — and *build* something, ready for the next maximum.

Imagine how you easily would impress folks at dinner parties if you could describe how you built a multi-whatnot, digitally-integrated gizmo with super-confabulated doo-dads.

No doubt they would all want one, so you could spend the rest of the sunspot minimum building clones of your original for all your new friends.

You might even make enough money from selling your gizmos to buy that new rig you were drooling over when it was reviewed in ARA.

One stage even better than building something, of course, is to *design* and build something. This requires considerably more commitment, more than a four or five year sunspot minimum might allow. But at least you would have something to do each time a minimum came around.

• The Experimental Approach — try a new mode.

Amateur radio has so much to offer! If your favorite mode or band or your particular interest goes under because the sunspots went away, don't despair — try something different.

To avoid the sunspot blues, why not try VHF (sideband or FM), UHF (ditto), packet, CW, RTTY, fast-scan TV, foxhunting, satellites? The list goes on...

Unfortunately, switching to a new mode may involve a little financial outlay or some home-brew creativity.

So a good way to go is to combine the Experimental Approach with the Creative Approach (see above) and build the necessary bits and pieces for the new mode you have decided to try.

The only question then remaining is "How many sunspot minima can I survive before I run out of new modes?" The answer lies in the Inventive Approach (see below) — make up your own mode!

$$L = 0.0004605b\left\{\log_{10}\left[\frac{2h}{a}\left(\frac{b+\sqrt{b^2+a^2}}{b+\sqrt{b^2+4h^2}}\right)\right]\right\} + 0.0002\left(\sqrt{b^2+4h^2}-\sqrt{b^2+a^2}+\frac{b}{4}-2h+a\right)$$

where
L = inductance in µH
a = wire radius in mm
b = wire length parallel to ground plane in mm
h = wire height above ground plane in mm

The above equation was first formulated during the Great Sunspot Minimum of 1944.

• The Inventive Approach — *discover* something.

A quick scan through the pages of the ARRL Handbook shows that quite a lot is already known about radio waves, electronic devices and modes of communication.

But never forget that amateur radio licences are granted primarily for the purposes of experimentation.

The earliest amateurs were the leaders in long-distance propagation and showed the rest of the world how radio waves behave.

Satellite techniques pioneered in the early OSCARs are now used commercially. Digital modes have been developed by amateurs which have then spun off into the commercial world.

So why can't *you* invent something? After all, you have several years during every sunspot minimum! Start off small and develop a new test instrument, say, or a more efficient RF amplifier. Then go for the big one — how about an amateur mode which compresses video and sends it in real time over a narrow bandwidth channel, for example?

Not an inventor? Never mind, discover a new theory or write a new equation. It is a well-known fact that scientific forward leaps always coincide with sunspot minima, when creativity does not have its usual outlet over the amateur bands (it's not true, actually, but it makes a good story, doesn't it?).

• The Friendly Approach — go down to the local club.

If you are bored witless while waiting for the bands to open up again, perhaps others are, too.

Why not go down to the local amateur radio club and catch up with folks you haven't seen for years but talk to quite regularly?

You might find that club activities have a lot to recommend them and that things are not so black, after all...

So finally, how is Here and There going to survive the current solar minimum? What can we write about when our aim is to try to reflect current happenings in amateur radio but nothing is happening?

Well, first of all, we take the Optimistic Approach and assume that the amateur radio business goes on as usual, sunspot minimum or not.

The shack here is equipped for a range of modes of communication, enough to see us through the deepest and longest solar minimum. And since we enjoy responding to your letters, we hope you are all Optimists, too.

But what *new* things can we try? Well, one area in which to work involves getting JVFAX to perform on automatic picture transmission (APT) images from NOAA and Meteor weather satellites. JVFAX has lots of tricks up its software sleeve, only a few of which we have discussed in these pages (mainly the SSTV modes).

So we'll have a go at getting into its other areas.

Another area bristling with things to try is computer software for amateurs. We have touched on a few programs here over the years but there are many more, just waiting for review.

Some are specifically written for the needs of amateur operators, while others are generic bits of software which have great potential for helping amateurs out. Watch this space...

Another area which I have dabbled in but never on behalf of Here and There is building equipment.

My forays into this area have so far been limited but very enjoyable. It would be good, for example, to get hold of a kit or two, or better still to build a design from the ground up, printed circuit board and all.

That's all from Here and There for this month.

We've had a not-too-serious look at surviving the sunspot minimum and in doing so met again some of the important elements of our favorite pastime — creativity, flexibility, companionship, the willingness to experiment and take risks.

See you next time in Here and There — and who knows what we'll be on about then?

Cheers and 73 from Paul, VK3DBP.

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Don't go mobile without a Yaesu Mobile Transceiver!

Whether you're going bush or operating around town, a quality mobile transceiver from Yaesu delivers the best performance.

FT-2400H Rugged 2m Transceiver

The ultimate in dependability and reliability! The FT-2400H is built using commercial grade mechanical and electronic construction techniques and meets the tough USA MIL- STD-810C shock and vibration requirements, so you know you're getting the highest quality. A one-piece die-cast chassis/heatsink allows three-step output of up to 50 watts without forced air cooling. Plus, fibreglass circuit boards and chip components provide professional-grade reliability. It has a large backlit LCD screen, backlit knobs and 31 tuneable memories (which can store frequency and a four-character name of your choice). A customised microprocessor also provides Auto Repeater Shift to suit Australian conditions. Two-stage track-tuning and a dual FET mixer improve receiver intermod performance. Scanning functions include programmable scan limits, selectable scan resume modes, memory skip, and priority monitoring.Seven selectable channel-steps and CTCSS encode are standard features. Comes complete with MH-26 hand mic., mobile mounting bracket and DC power lead.

Cat D-3630

2 Year Warranty

$649

Save $50

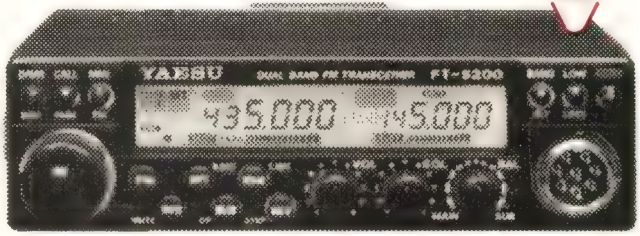
FT-5200 2m/70cm Mobile Transceiver

The FT-5200 uses the latest innovations in compact cross-band full-duplex and detachable front-panel design for brilliant mobile performance. It has 32 tuneable memories, a built-in antenna duplexer, dual full-frequency LCD screen (with signal strength/power output bargraphs for each band), 8-level automatic display/button lighting dimmer and dual external speaker jacks (one for each band.) A thermally-activated fan allows up to 50 watts output on the 2-meter band and 35 on the 70cm band. Plus, scanning features include programmable scan limits, selectable scan resume modes, memory skip, priority monitoring and one-touch recall CALL channels. In addition, 6 user-selectable channel steps are provided and a FRC-4 DTMF paging selcall option lets you program a three-digit ID code so you can be paged by other transceivers, or page up to 5 other stations yourself. An optional YSK-1 remote panel lets you relocate the main rig (under the front seat, for example) and mount the control panel on the dash. The FT-5200 comes with hand-mic, mobile mounting bracket and DC power lead.

Cat D-3310

2 Year Warranty

$1399



Yaesu FT-840 HF Transceiver

The FT-840 HF mobile transceiver sets the new standard for high performance in affordable transceivers.
Covering all HF amateur bands from 160m-10m with 100w P.E.P output, and with continuous receiver coverage from 100kHz to 30MHz, the FT-840 provides SSB/CW/AM operation (FM optional), 100 memory channels, a large back-lit LCD screen, two independent VFOs per band, an effective noise blanker and an uncluttered front panel, all in a compact case size of just 238 x 93 x 243mm (WHD).
The FT-840 provides an SSB Speech processor for greater audio punch, and IF Shift plus CW Reverse to fight interference. Dual Direct Digital Synthesisers ensure clean transmitter output and fast Tx/Rx switching, while the low-noise receiver front-end uses an active double-balanced mixer and selectable attenuator for improved strong signal handling.
An extensive range of accessory lines are available, including the FC-10 external automatic antenna tuner, so you can customise the FT-840 to suit your operating requirements.

Cat D-3275

2 Year Warranty

$1595

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Clearance!

Handhelds Way Below Cost!

Yaesu FT-415 Deluxe 2m Handheld

While stocks last, grab a deluxe FT-415 at a great bargain price!

- 144-148MHz Tx, 140-174MHz Rx
- 41 memories, 2 VFOs
- Keypad and dial frequency entry
- Selectable Auto Repeater shift (VK version)
- DTMF paging, variable Auto Battery Saver, Auto Power off, VOX, DC power socket
- Complete with 1000mA/H NiCad (2W RF out), carry case, belt-clip and AC charger

Cat D-3610

Only $399

2 Year Warranty

Monthly Specials!

Grab a bargain while stocks last. Prices are valid until 28th February '95, and some items have limited stocks available.

Some units may be shop soiled but full warranties apply.

Save $300! Limited Stocks!

Yaesu FT-530 2m/70cm Handheld

With 1000mA/H NiCd battery, carry case, belt-clip and AC charger. Features extended receive on VHF and UHF, cross-band repeat facility, dual receive and 2 year warranty.

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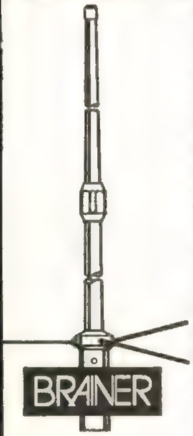

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2m/70cm GST-1

Frequency: 144-148MHz, 430-450MHz
Gain: 6dB on 2m, 8dB on 70cm
Max. Power: 200W
Length: 2.5m
Type: 2 x 5/8 wave (2m)
4 x 5/8 wave (70cm)
Connector: SO-239 socket

$199
Cat D-4830

2m/70cm GST-3

Frequency: 144-148MHz, 430-440MHz
Gain: 7.9dB on 2m, 11.7dB on 70cm
Max. Power: 200W
Length: 4.4m
Type: 3 x 5/8 wave (2m)
7 x 5/8 wave (70 cm)
Connector: SO-239 socket

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Cat D-4835

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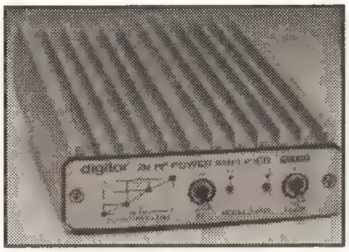
Boost your 2m hand-held's erformance with this compact amplifier. Works with 0.3 to 5W nput and provides up to 30W F output, plus has an inbuilt GaAsFet receive pre-amp roviding 12dB gain. A large eatsink and metal casing allow or extended transmissions at ull output, and a mobile ounting bracket is supplied or vehicle use. Requires 13.8V C at 5A max. Size 100 x 36 x 175mm (W x H x D).



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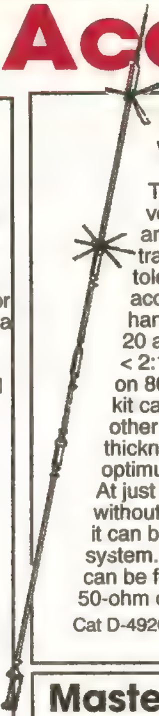

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The rugged 5BTV is a 5-band HF trap vertical which continues the Hustler tradition of quality and performance. It incorporates Hustler's exclusive trap design (25mm solid fibreglass formers, high tolerance trap covers and low loss windings) for accurate trap resonance with 1 kW (PEP) power handling. Wideband coverage is provided on the 10, 15, 20 and 40m bands (SWR typically 1.15:1 at resonance, < 2:1 SWR at band edges) with 80kHz bandwidth typical on 80m at less than 2:1 SWR. An optional 30m resonator kit can also be installed without affecting operation of the other bands. High strength aluminium and a 4mm (wall thickness) extra heavy-duty base section guarantee optimum mechanical stability.

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Cat D-4920

HUSTLER

$299

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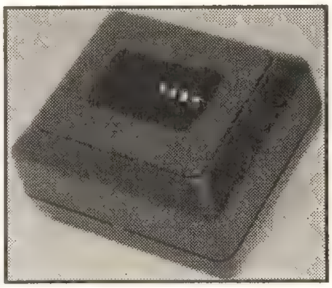

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TORES ACROSS AUSTRALIA AND NEW ZEALAND

***MAJOR AMATEUR STOCKIST STORES SHOWN IN RED**

WHAT COMES NEXT?

Decigrads, decimal feet, maybe even a 10 hour clock

How will these changes affect the ordinary radio amateur?

By Dick Bird, G4ZU/F6IDC,

Primitive man had little need of Einstein's rather complicated theories to convince him of the close relationship between the movement of a body in SPACE and the lapse of TIME. He soon discovered that the most favorable night-time hunting conditions, with the full moon high in the sky, could be expected after a regular time-lapse of some of 29 to 30 days. (In Anglo-Saxon countries, we have adopted the designation of lunar MONTH (moon-th), for this 29-30 day cycle.)

See Reference One.

For determining time-spans of somewhat longer duration, perhaps to calculate the age of a child, or to predict the most favorable periods for sowing and harvesting, the early civilisations became aware of the need for some sort of calendar.

Even to this day, many farmers watch the calendar, and insist that autumn full-moon is the ideal moment for the sowing and rapid germination of seed. It will therefore come as no surprise when we discover that most of the early calendars were constructed on a lunar basis, with the year divided up into 12 monthly or 'Lunar' periods of 30 days.

It was found, however, that the 360 day Lunar calendar tended to get out of step with the Solar cycle of 365 days, but in due course, this was corrected by creating an additional five or six day feast period, which was devoted to welcoming in the New Year, hence our Xmas and New Year festivities.

See Reference Two.

FEMALE FERTILITY...!

The Early Chaldeans thought that they could detect some sort of correlation between the female rhythm of fertility, the movement of tidal waters, and the 30 day Lunar cycle, and they could not easily overlook the importance of Solar radiation in furthering the germination of seed and the ripening of fruit.

They reasoned that, quite apart from Solar and Lunar influences, the stars and planets might also have some sort of influence upon human affairs, so they maintained remarkably precise and detailed astronomical records, hoping that, in due course, they would even be able to predict the future movements of these heavenly bodies, and foresee important events such as a Solar or Lunar Eclipse. These latter were thought to be a battle between the Solar and Lunar deities for domination of the universe, with a consequent risk of cosmic calamities, such as earthquakes, volcanic eruptions, very violent storms and hurricanes, and wide-spread flooding. Maybe they still had memories of the Biblical deluge? The 360 degree circle had not yet been invented, so for recording angular movements, they first of all divided the heavenly sphere into four equal parts, to represent north, south, east and west. They noticed that, relative to the stars, the Sun seemed to advance each day by one three hundred and sixtieth of a complete circle, so they decided to make their calendar circular in form, the circle being divided into 360 equal parts, one for each day of the year, and with twelve 30 day segments to represent the lunar cycles.

> ***This might all sound a little heavy, however, it makes for interesting reading and, as Dick says, "Don't be too alarmed by all the above, because nine times out of ten, when I try to play the prophet, it generally turns out that I was wrong. In ancient China, I would almost certainly have been beheaded!"***

See Reference Three.

Somewhat later, the day was also sub-divided into 12 equal parts, so that the regular manual workers would know when to start and finish their labors, and to permit payment of casual employment on an hourly basis. A rod, planted in the ground to form a sun-dial, with 12 equal divisions, served to obviate any risk of dispute in respect of precise starting and finishing times.

See Reference Four.

This tradition of making measurements to a base of TWELVE still lingers on, and until quite recently, the Anglo-Saxon countries had not only the customary 12 hours to the day, but also 12 pennies to the shilling, and 12 inches to the foot.

If I remember correctly, the old English half-penny had a width of exactly one inch, and the penny was, in the past, used as a measure of weight for postal purposes (a 1p stamp for a penny-weight letter).

A ROMAN LEGACY

The inch, the foot, and the penny, are a legacy from the Roman Conquest, the standard foot having a length of about 30cm.

- The Roman soldiers must have had rather large feet!

- Although the ancient Roman Empire was very skilled in conquest, road building, and general administration, it was somewhat at a disadvantage when it came to mathematics.

- They used I for 1, II for 2, IV for 4, V for 5, VI for 6, and so on, and had to go over to X for ten, XII for 12, and various other letters such as L, C and M for larger amounts.

- Just imagine trying to multiply and divide on such a basis!

- Strange to say, the Romans originally had a 10-month calendar, which finished up with DECember (almost on a decimal basis!), but Julius Caesar introduced a couple of additional months,

July and August, so that his name and that of his father, Augustus, would go down in history and never be forgotten in later years.

Once more, a Calendar based upon this magic number of 12.

See Reference Five.

DECIMALS AND THE METRIC SYSTEM

Use of the decimal point, with zeros for very small quantities, was first developed in ancient India. It later spread to the Arab countries, and finally to Europe during the period known as the Renaissance. The decimal system naturally remained a complete mystery for the general public, but for scientific workers, here at last was a tool which permitted really precise mathematical calculations.

In Post-Revolutionary France, Napoleon was bold enough to introduce a metric system for every-day weights and measures - the gram and the metre - and he even ordered that the circumference of a circle be divided into 400 'grads', instead of the traditional 360 degrees.

See Reference Six.

TRUST THE FRENCH TO BE DIFFERENT

Even to this day, the latitude and longitude on most French maps is recorded on this basis, with the zero line quite often centred not on the Greenwich Meridian, but on Paris!

Just like Julius Caesar, Napoleon also tried to introduce his own personal 'Revolutionary Calendar', starting at the Autumn Equinox, with the months divided into 'decades' each of 10 days, but the general public was reluctant to abandon its habitual seven day week, and the Napoleonic metric-based calendar fell unhappily by the wayside, and is now just a past memory.

See Reference Seven.

So to what extent does the present metric trend affect the ordinary radio amateur?

Looking first at normal every-day matters, we find that, in the UK, most of the petrol filling stations are now marking their prices both in litres and in gallons, and road signs are slowly being converted to give the distance in kilometres instead of the former statute miles.

IT EVEN AFFECTS THE BEER

The 12 pennies to a shilling, and 20 shillings to one pound sterling were abandoned quite some time back in favor of 100 'new' pence to one pound. A litre, rather than a pint of beer, and weight in grams or kg, rather than in pounds and ounces, also seem to have been accepted with quite good grace.

In North America we find a much more marked reluctance to adopt any of our new metric standards. For example, they still stick to their US Gallon (which is less than the old UK gallon), and continue to speak in terms of 'miles per gallon' (US gallons, of course!), rather than in 'litres per 100km', as you use in Australia and we use here in Europe. It also seems most unlikely that the Americans would ever consider changing their 60cps electric power supplies to 50cps.

If, however, they bring one of their 60 cps mains-driven clocks on a business trip to Europe, they find, rather to their surprise, that it has suddenly decided to go 'metric', with the hour hand making not 24, but only 20 revolutions per day!

I have noticed that, in the United States, even when they DO decide to use metric terms, the spelling is sometimes just a little peculiar, eg 'meters' instead of metres. I always thought that meters should be mounted in holes on a panel!

COMPUTER PROGRAMS CAN BE A WORRY

With computer programs, or for any calculations of a complex nature, they appreciate the quite obvious inconvenience of feet and inches, with 12 inches to the foot, and in many cases, they now make use of 'decimal feet' or 'decimal inches'.

The worst part is when they try to work in metres. Radio amateurs are well conditioned to thinking in metric terms, and are well aware that a half-wave dipole for the 20 metre band will need to be cut to a length of around 10 metres.

ERRONEOUS DATA ENTRY!

Quite a number of American antenna designs programs have, in fact, gone over to the use metric units. But beware! It is so easy to fall into the trap of entering the length of an antenna as, let's say, 20.3 metres. Unfortunately, a message promptly appears on the screen saying, "Erroneous data entry! Start again from the beginning!"

After much deep thought, and careful re-checking of all your figures, you suddenly realise that you should have entered "20.3 metERs", not 20.3 metREs.

AT THE THIRD STROKE... IT WILL BE TEN DECIGRADS PER FURLONG.
BIP BIP BIP

With luck, you will then be in business! Even when you DO succeed in getting the final print-out, there is always the nasty feeling that, prior to publication, it might perhaps be better if the 'meters' were changed back again into decimal feet, or even feet and inches, in order to avoid offending some of the die-hards who MUST still be around, not only in the USA, but maybe even in the UK?

ANTENNA DESIGN IS NOT EASY

As you can see, antenna design and evaluation by computer can be full of problems, quite apart from various other pit-falls, such as dBd or dBi, or choosing free-space gain as against gain at a normal working height above ground. I often wonder just what readers would really prefer when it comes to stating linear dimensions: metres, feet and inches, or 'decimal feet'?

....☞

WHAT COMES NEXT?

Decigrads, decimal feet, maybe even a 10 hour clock

How will these changes affect the ordinary radio amateur?

One possible solution would be to quote the dimensions in decimal fractions of a free-space wavelength! The same basic design would then be instantly applicable from 160 metres right up to the top end of the 10 metre band.

Until we have all these problems sorted out, the only thing I can think of for the interim period is an all-time print-out of dipole lengths for the main amateur bands, with dimensions both in feet and in metres.

When you are pushed for time, this would save you having to search around for the right formula - feet or metres? - and then fiddling about with a pocket calculator.

Strange to say, you don't often find this sort of thing in books and magazines, because type-setting tables of figures is a real pain in the neck for the editorial staff!

HUMBLE APOLOGIES TO ALL CONCERNED

Here it is, anyway, and it comes with my humble apologies to all concerned with getting it into shape for publication.

I must admit that I also found it rather hard work to put together, and I finally gave up when it came to converting the decimal feet printout from my computer into feet and inches!

Decimal feet to metres is more simple. You just multiply by 0.3048. For converting decimal feet to feet and inches, and for converting inches and fractions to decimal inches, you will find a useful table at the back end of the ARRL Antenna Handbook... but an accompanying note states that it is correct only to the nearest sixteenth part!

Table of dipole lengths

Freq (MHz)	Length in metres	Length in metric feet
3.580	39.9	131
3.730	38.3	125
7.050	20.3	66.6
14.200	10.07	35.1
18.100	7.9	25.9
21.225	6.74	22.1
24.900	5.74	18.8
28.500	5.02	16.4
29.500	4.85	15.9

NOTE: The listed lengths are for an ordinary wire dipole at band centre, and will ensure less than 2:1 SWR over the entire band, with the exception of the rather extensive 10 and 80 metre bands, which have been split into two independent sections. With plastic covered wire, the lengths should be reduced by 3% to allow for the loading effect of the plastic covering. Self-supporting dipoles in dural tube will also need to be 3% to 5% shorter, because of the larger physical diameter.

REFERENCES AND HISTORICAL NOTES

1. In Iceland, archaeologists have unearthed the tusk of a mammoth, engraved with a series of 29 deep inci-

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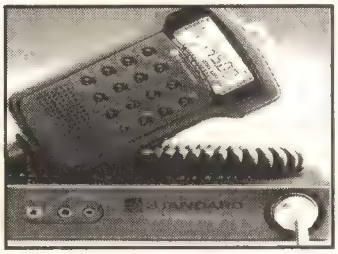

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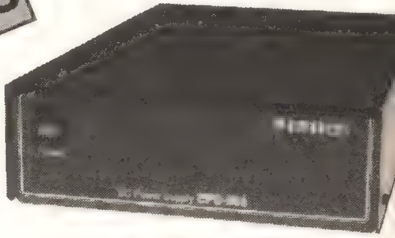

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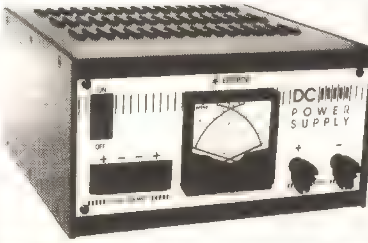

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sions. It is thought that this may have been employed by primitive man to mark off the days which had elapsed since the last full moon!

2. The circular Stonehenge structure in the UK is thought to be some sort of Solar Calendar, and was probably used for marking the Winter Solstice, and start of the New Year festivities.

3. The Chaldeans kept their records by means of strokes impressed on clay tablets. For small quantities, they naturally preferred the simpler fractions such as 1/2, 1/3, or 1/4, but when so required, these could be further subdivided to make 1/12th, or even 1/360th. (note the absence of anything to a base of 10!).

4. The ancient Egyptians also had a twelve-hour day, which was divided into FOUR three-hour periods. Being practically on the Equator, a sun-dial would have been of very limited value, and instead, they carefully aligned their Pyramids so that appropriate sides were illuminated by the Sun, or in shadow, at the beginning and end of each quarterly period. (At mid-day, the sun would, quite obviously, be vertically overhead with all four faces fully illuminated (time for a three-hour siesta!).

5. The Roman Calendar was based upon a seven-day Week, the various days of the week being devoted respectively to the Sun, the Moon, and the five visible planets.

Hence our Sunday and Monday (moon day), the French Mardi (Mars day), Mercredi (Mercury day), Jeudi, (Jove or Jupiter day), Vendredi (Venus day), and finally Saturday (Saturn's day). By some happy coincidence, with the Roman 365-day calendar, the New Year always started with a different calendar day, and this avoided any sort of jealously among the various planetary gods! This still seems to hold good, even with our 366 day leap-years.

6. It is rumored that Napoleon also had in mind a decimal clock, with a ten-hour day, and one hundred minutes to the hour, the minutes being sub-divided into 100 seconds.

This might not please our mathematicians and astronomers, who habitually work in milli-seconds, but would NOT upset our present system of frequency measurement. See below...

THE SECOND

Due to the Earth's elliptical orbit around the Sun, the length of the Solar day can vary between extremes of approximately ±16 minutes, or an amazing 960 seconds!

We call this variation the 'equation of TIME'. For really precise measurements, the second was therefore defined as a 1/24 X 60 X 60 fraction of the 'mean solar day' or, more precisely, as 1/86, 164.09 of a sidereal day. (The slight difference between these two amounts is due in part to the slow, but constant, precession of the Equinoxes.)

FREQUENCY AND TIME MEASUREMENTS

For general convenience, our domestic clocks are regulated so that they keep more or less in phase with the solar day, (±16 minutes, remember!), and we assume that there are exactly 365 days in a year, although viewed from outer space, it would be seen that the Earth actually makes more like 366.25 revolutions during the course of a year. However, the Earth's orbit around the Sun happens by chance to be in an anti-clockwise direction, with the result that we lose one day and finish up with the customary 365.25, (not 366.25) days. The odd 0.25 parts of a

....☞

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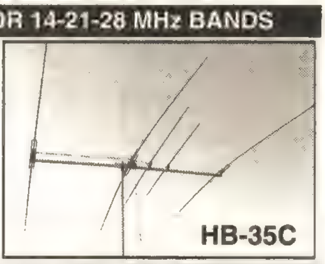
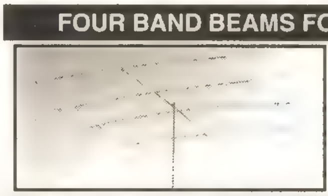
TE-13 rotatable dipole	**$199**
TE-23 2-element beam	**$414**
TE-23M 2-ele. mini-beam	**$440**
TE-33 3-element beam	**$575**
TE-43 4-element beam	**$750**
HB-35C 5-element trapless beam	**$770**



HB-35C

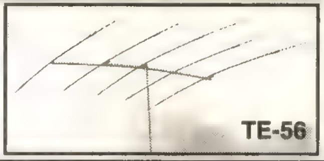
FOUR BAND BEAMS FOR 7-14-21-28 MHz BANDS



TE-14 rotatable dipole	**$275**
TE-34 3-ele beam on 14-21-28MHz, 1-ele on 7MHz	**$695**
TE-44 4-ele beam on 14-21-28MHz, 1-ele on 7MHz	**$870**

SIX BAND BEAMS FOR 10-14-18-21-25-28 MHz BANDS

TE-26 dual rotatable dipole	**$380**
TE-46 3-ele beam on 14-21-28MHz, 1-ele on 10-18-25MHz	**$750**
TE-56 3-ele beam on 14-21-28MHz, 2-ele on 10-18-25MHz	**$950**



TE-56

EMTRONICS

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day in each calendar year are obviously cumulative, and this is partially corrected by having only 28 days in the second month of normal years, and by adding in an extra day every fourth year, to make a 366 day 'leap-year', with 29 days instead of 28 in February.

The day is divided into 24 one-hour periods, and further sub-divided into 60 minutes and 3600 seconds.

AND THEN WE GO GEOMETRIC

Thereafter, we seem to go metric, with milli-seconds and micro-seconds! For measurements of power supply frequencies, and for frequencies in the audible range (up to 20kHz), the normal 'clock' second generally provides an adequate standard of reference.

However, the rotational period of the Earth is subject to various rather irregular fluctuations, and is tending to slow down, so for precise radio frequency measurements our scientists were forced to adopt an independent atomic standard. To avoid confusion between the 'clock second' and the 'atomic second', radio frequencies are now quoted as being so many kHz, or MHz, while for power supply and audio frequencies, we retain the familiar cps (cycles per second), eg 10,000 cps, or 10Kcs.

In radio amateur communication, we should, strictly speaking, say Please QSY 10 kHz up, not 10kc up, but it would be quite in order to complain of a 1kc (audible) heterodyne whistle.

It is important that we maintain this clear distinction between clock time and atomic time because if, at some future date, we switch over to metric time-keeping, with metric seconds which might bear little relationship to our existing clock seconds, our present methods of radio frequency measurement can remain completely unaffected.

THE EARTH IS SLOWING DOWN

The Earth is presently going through a phase of 'slowing down', and in an attempt to keep our clocks in phase with 'atomic time', the French 'Bureau de l'heure' at Paris announces periodically that all mechanical clocks should be re-adjusted by a second or more, in order to keep the 'clock-second' more or less in phase with the 'atomic second'. This problem would obviously disappear if we changed to decimal time-keeping.

Would it be over-rash to hazard that, come the year 2000, we will have changed to a twenty-hour day, the hour being sub-divided into 100 minutes, and the minutes further divided into 100 'clock seconds'? (Perhaps it would be better to could call them 'Ticks' or 'Tocks'?) To avoid massive worker strikes, we would obviously be obliged to maintain the customary 10-minute morning coffee-break, which would become equal to nearly 15 old minutes (no problem!), but I see very little hope of a ten-day week, unless we offered a three day week-end, plus ten days off for the Christmas and New Year festivities!

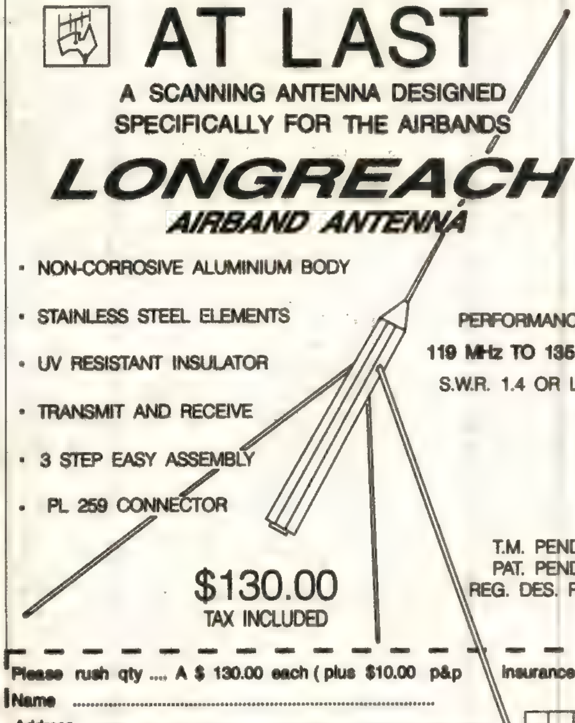
And while we are about it, we might just as well abolish our rather stupid changes from Summer to Winter time, and adopt Universal Time on a global basis. This is already normal practice for radio amateur communications.

DO NOT BE ALARMED, HOWEVER!

Don't be too alarmed by all the above, because nine times out of ten, when I try to play the prophet, it generally turns out that I was wrong.

In ancient China, I would almost certainly have been beheaded!

73 Dick Bird G4ZU.



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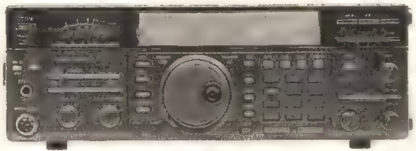

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Build your own 1200 Baud modem...

The TeeNCee 2

by Peter Philippa - VK2UPP

It is only after obtaining one's licence that the diversity of amateur radio becomes apparent. Before becoming qualified I thought that amateur radio meant that you pick up the 'gob-box' (mike) and had a natter to someone at the other end of the 'stick' (antenna). How wrong one can be?!

Fortunately my peers were around to explain that "...you don't *talk* on the frequencies that you hear the packet zzzzziiiiiitttttts..."

This, incidentally, explains the reason I didn't get any response from a CQ call!

So, yet again I was bedazzled by another facet of the hobby — computer applications on the airwaves!

After some investigation I found out that I needed to hook a thing called a TNC between my computer and my plain old ordinary transceiver to work out what those noises were. Then I found out that I had to be careful to use a limited-bandwidth TNC on the frequency so I didn't cause splatter halfway across the band. So, the basic rules appeared to be 300 baud for HF, 1200 baud for VHF, optionally higher baud for UHF... and that's about it.

I then started hunting around for a TNC to get myself on the air. Though at an affordable price, I was disappointed not to find an Australian product on the market — besides, the challenge of the project was inviting!

So the next thing I knew...

The design...

To take on the task, by consensus with experienced packeteers, it was decided we needed to address the following issues:

- low power, 12 volt operation,
- capable of further development,
- minimal components,
- low cost,
- built-in messaging system,
- KISS mode,
- digipeating, and
- easy kit assembly.

Low power requirements have easily been achieved by keeping the component count down to a minimum and by using CMOS components. Though some components aren't available from your local electronics corner store, they are in the design because they were considered to deliver 'more bang for the buck' — ie. good value!

The messaging system, KISS mode and digipeating are software features which aren't directly hardware dependent, but had to be considered during the hardware development.

Easy kit assembly has been achieved by providing a pre-drilled, silk screen-printed housing. Only two wires are required... and both of them connect to the power switch. The PCB is quite a complicated design — double-sided with plated-through holes — so, to minimise the possibility of soldering errors, the PCB has a solder mask on both the top and bottom layers — and, as an added bonus, a component overlay to reduce mis-placement of components.

Circuit Description

The microprocessor selected to perform the job of the 'brain' is a **Motorola MC68HC11A1**. This chip is loaded with features; a watch-dog, A/D converter, timers, a serial UART and EEPROM. The PLCC package (rather than a 40-pin DIP package) was selected because it requires less PCB space. The other attraction about this device is that it consumes only about 20mA.

As with any microprocessor design, extra devices which are mandatory for operation include RAM (in this case 62C256), EPROM (27C256); a 74HC573, which is used to decode the low address bus; and the 74HC00 which is used to decode the RAM and EPROM memory space. The MC34064 is used to provide a clean reset; and if the VCC voltage rail drops below 4.75V, it will hold the reset line low.

In addition, other devices are used to add supporting functionality. The 74HC595 is used to provide outputs to drive the LEDs and to provide signalling to an optional external interface to a beam antenna rotator. The TCM3105 chip is the 1200 bps modem that interfaces to the radio. To permit the computer terminal to communicate with *TeeNCee*, a MAX232 chip is used to convert the signal levels to RS232 specifications.

What you may find notably different from this design to current TNC designs is the omission of a high-level data link control (HDLC) chip. Instead, software has been used to eliminate the need for the HDLC chip (and its associated components), permitting a flexible alternative.

Also, to give this unit a head-start in keeping up with the relentless pace of technology, a 16-pin header has been incorporated into the design to allow for an alternative radio interface. This means that, as your needs change, you have an opportunity to update at minimal expense.

Some possibilities for the expansion header are 300 bps for HF, 2400 bps for VHF, FAX, RTTY, or maybe even a CW interface...

Also note that as always we're interested in *your* comments, suggestions for improvements, etc. which can be faxed to (049) 477 484 or by 'phone to (049) 477 733.

The TNC can be powered from either an AC or DC power source of 9 volts or greater. Less than 100mA is required to run the unit. If you run the circuit from voltages above 14 volts, you will require a heat sink of some description on the 7805 voltage regulator.

Typical current draw is 50mA, with a peak current draw of 75mA measured with all five LEDs lit.

If you want to power the unit from a battery source, try increasing the resistance of R2 through R6 from 560Ω to 1K, at the price of lower illumination of the LEDs. If power consumption is a paramount problem, remove R2 through R6 altogether — but *no* LEDs will be lit in any condition. This will drop the total current draw to below 40mA.

Assembly

The *TeeNCee* kit comes with all parts to build the completed unit, including a pre-drilled and silk screen-printed housing. Also the kit includes a double-sided plated-through PCB with a component overlay and solder mask to assist with component location and orientation.

Before commencing the assembly, ensure that you observe all necessary precautions to prevent damage to the CMOS devices. *Don't* wear clothes which can cause static electricity build-up and *don't* work on a laminated surface. Also, ensure you ground yourself before handling the CMOS devices!

Start by inserting and soldering the resistors and diodes. Insert the SIP resistor pack — pin 1 of this resistor array is indicated by a dot. Next insert and solder the 74HC573, 74HC595, 74HC00, 62C256 and TCM3105 chips. Pin 1 of each chip is aligned with the square solder pad on the PCB. The socket for the 27C256 EPROM is next.

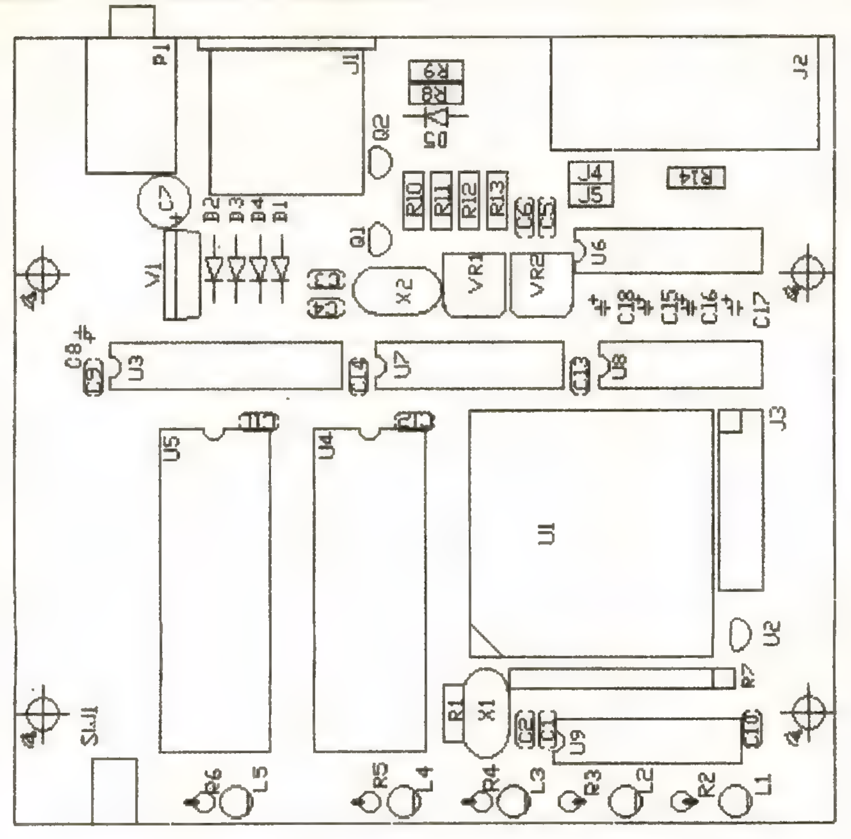
The MAX232 chip can be inserted next if your computer terminal uses **RS232** signal levels. If you intend connecting *TeeNCee* to a terminal which uses **TTL levels** (eg Commodore 64, C-128 and Vic-20), do not insert U6, C15, C16, C17 or C18. Instead you will need to place 100Ω resistors between the following pins located in the U6 component position:

A resistor between pins 11 and 14; another resistor between pins 12 and 13; another between pins 7 and 12 and, finally, another between pins 8 and 9. Also, to activate the DSR signal, solder a jumper wire between the + pad of C18 and the + pad of C17.

The next component for insertion is the microprocessor socket. At first glance this socket will appear to fit in any of four ways — but don't be deceived, it's polarised. One inside corner of the socket has a 45 degree edge. This is always to the left of pin 1 on the chip. Pin 1 is marked on all ICs with a square pad; in the case of the microprocessor pin 1 is located in the centre of the dual rows of pins; not on a corner as you may expect. Double check — even *triple* check — the polarisation of this socket before commencing soldering. The only successful way to remove a mis-oriented PLCC socket is to cut it off the circuit board, then clean out the pads and start with a fresh socket. It is not a pleasant (or cheap) task!

Assuming you've stayed with me thus far, the low-profile capacitors can now be inserted and soldered, followed by the transistors and the MC34064. The voltage regulator can be mounted either perpendicular to the PCB or, preferably, laid flat on the PCB. When flat-mounted, the regulator is afforded heat-sinking by the mounting hole through to the housing base.

The trim-pots and crystals are fitted next. The LEDs are next for population — note that they are folded over so that the leads lie flat on the PCB. The rear of the lens should be hard against the edge of the PCB. A two-pin header is fitted *across* J4 and J5 — it is required for calibrating the modem.



Component Overlay - Actual PCB size is 95mm x 88mm

The tantalum and electrolytic caps are next, followed by the D9 and the 3.5mm connector. See **Figure 1** for mounting of the 3.5mm socket. The 8-pin DIN socket can now be fitted and soldered, followed by the wiring of the power switch.

Power on and testing

Before inserting the microprocessor and EPROM, plug the unit into a voltage source (AC or DC 9-14 volts) and do some voltage checks.

First, switch the unit on. You should observe L5 lit — if it's not switch off the power *immediately* and check the orientation of *all* components. If okay, we next check the power supply.

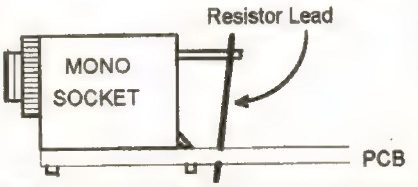


Figure 1: Mounting the 3.5mm Mono socket

Clip the negative lead of your multimeter to the case of the 7805 voltage regulator and place the positive lead on pin 20 of the 74HC573. You should get a reading of 5VDC (±5%). If this is not the case, check the power supply circuitry is installed properly.

If all okay, place the positive lead to pin 2 of the MAX232 chip. A reading of about 10VDC (±5%) should appear. Next place your positive lead to pin 6 of the MAX232 chip and a reading of about -10VDC should be read. If either reading is incorrect check the circuitry and capacitors around the MAX232 chip.

Finally, take a reading from pin 9 of the 74HC595, where a reading of 5VDC should be evident. If not, check the orientation of the MC34064 and the orientation of the SIP resistor, R7.

Now switch off the power and remove the power connector. The microprocessor can now be inserted into its socket — again, look for the angled corner on the chip. The best way to do this is to orient the chip over the socket then push the chip firmly into the socket. As you push, make sure the chip doesn't 'tilt' to one side, as this may over-stress the socket pins.

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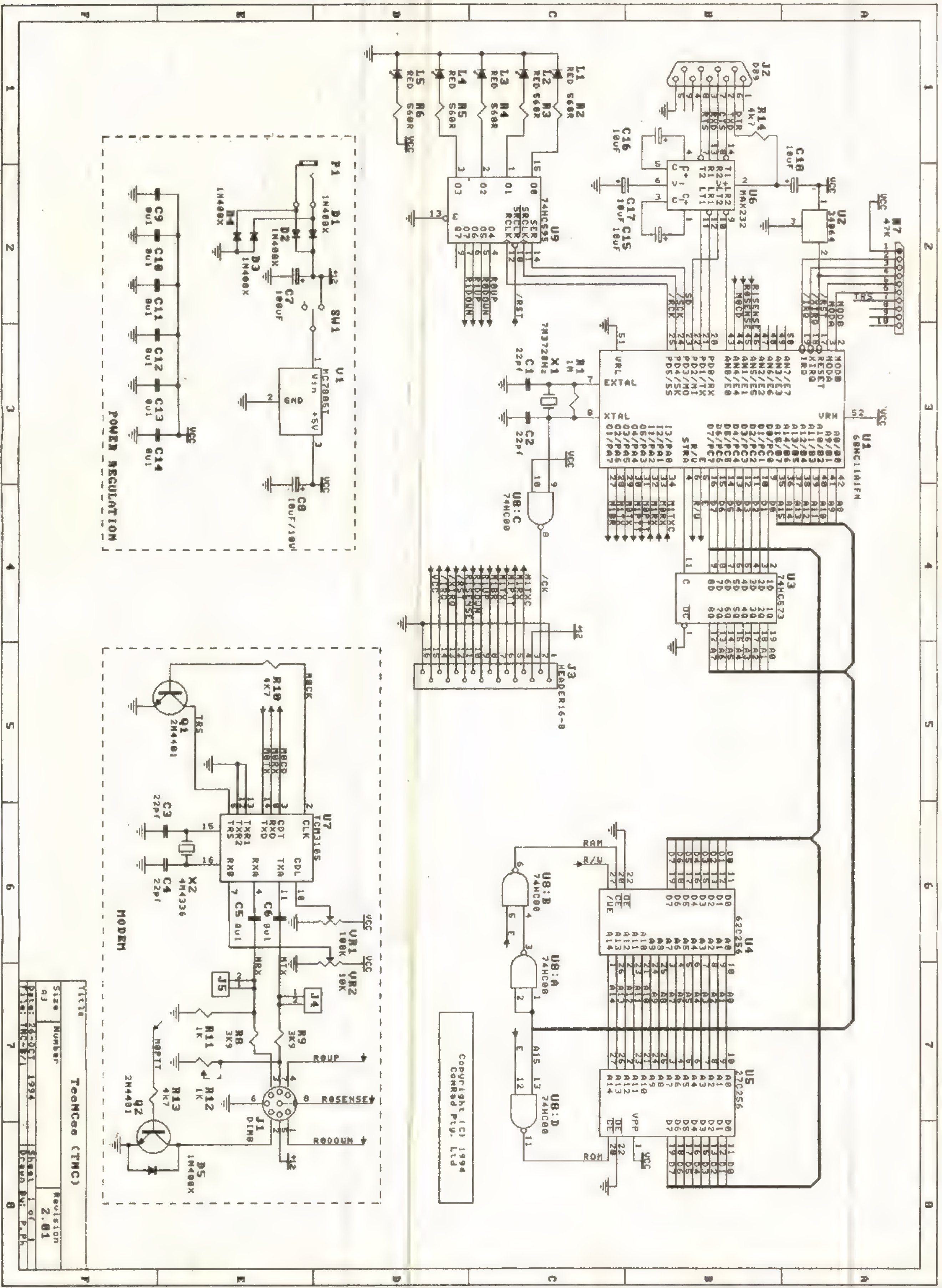

TeeNCee (TNC)
Size A3
Revision 2.01
Date: 26-OCT-1994
Sheet 1 of 1
Drawn By: P.Ph.
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POWER REGULATION
MODEM
U1 68HC11A1FN
U1 MC7805T
U2 34064
U3 74HC573
U4 62C256
U5 27C256
U6 MAX232
U7 TCM3105
U8:A 74HC00
U8:B 74HC00
U8:C 74HC00
U8:D 74HC00
U9 74HC595
J1 DIN8
J2 DB9
J3 HEADER16-B
X1 7.3728MHz
X2 4M4336
Q1 2N4401
Q2 2N4401
SW1
P1
D1 1N400X
D2 1N400X
D3 1N400X
D4 1N400X
D5 1N400X
L1 RED
L2 RED
L3 RED
L4 RED
L5 RED
R1 1M
R2 560R
R3 560R
R4 560R
R5 560R
R6 560R
R7 47K
R8 3K9
R9 3K9
R10 4K7
R11 1K
R12 1K
R13 4K7
R14 4K7
VR1 100K
VR2 10K
C1 22pf
C2 22pf
C3 22pf
C4 22pf
C5 0u1
C6 0u1
C7 100uF
C8 10uF/10V
C9 0u1
C10 0u1
C11 0u1
C12 0u1
C13 0u1
C14 0u1
C15 10uF
C16 10uF
C17 10uF
C18 10uF
J4
J5
RAM
ROM
R/W
RDUP
RDDOWN
RDSENSE
MDPTT
MDTX
MDRX
MDCD
MDCK
TRS
VCC
+12

Finally, the EPROM may be inserted into its socket with pin 1 closest to the voltage regulator.

Now it's time to *really* see it work. Holding your breath, connect *TeeNCee* to your PC using a suitable serial cable. A suitable terminal program, configured to N,8,1 and 1200bps, can be used to allow you to calibrate the unit. Once your PC software is running, power up *TeeNCee* again.

You will probably observe all the LEDs being lit. After about two seconds, switch *TeeNCee* off, wait a moment, then turn it back on again. (This allows *TeeNCee* to configure the microprocessor for operation.)

All being well, you should see a copyright banner appear on your screen, and you can start breathing again. If the banner doesn't appear immediately upon power-up of the unit, switch it off and systematically check that all components have been inserted and soldered correctly. In particular, closely examine the solder joints for short circuits to adjacent pads or dry joints.

After the copyright notice, a **cmd**: prompt should appear.

Calibration

To commence calibration type **cal on** at the prompt. This command is immediately executed. The microprocessor will send a 1200 baud square wave to the modem chip. *TeeNCee* has been designed so that there is no necessity for specialised equipment during calibration.

Using a small screwdriver, short the two pins of the header fitted across J4 and J5. Observe the reaction of the CD LED as you touch the screwdriver across these pins, then remove the short. VR1 will need to be adjusted so that the CD LED is lit when the screwdriver is shorting the header pins. When the screwdriver is removed, the CD LED immediately extinguishes. If the setting of VR1 is incorrect, you will either observe 'hanging' of the LED after removing the short, or the LED will not immediately illuminate when the short is placed.

VR2 now has to be adjusted. This is used to set the modem receive bias. Again, short the pin header at J4-J5, but this time observe the reaction of the MSG LED.

First, turn VR2 fully anti-clockwise. Then *slowly* turn VR2 clockwise and

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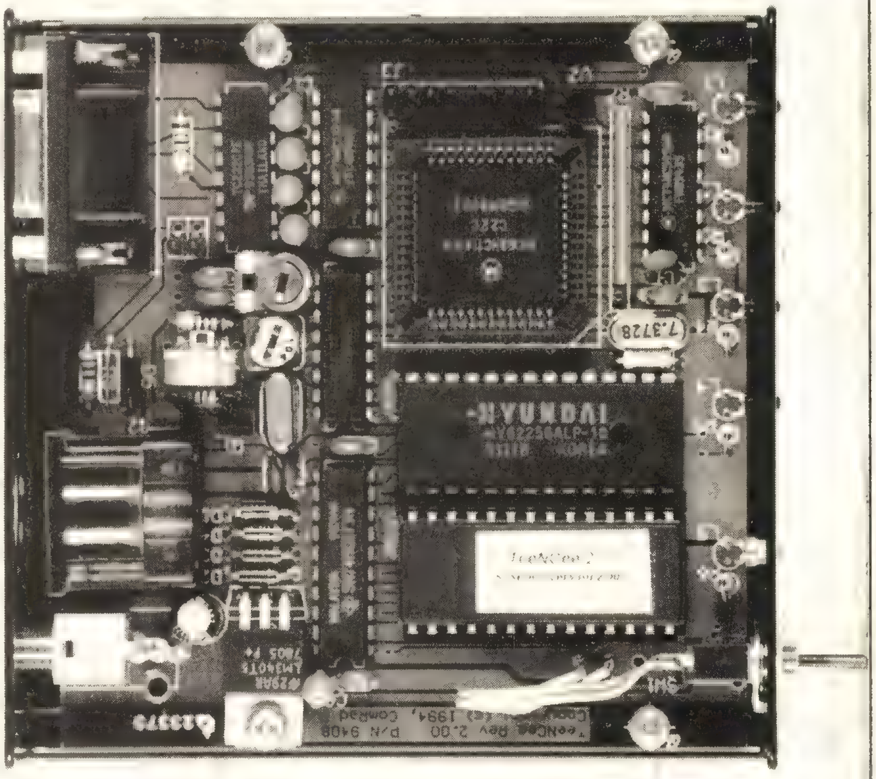

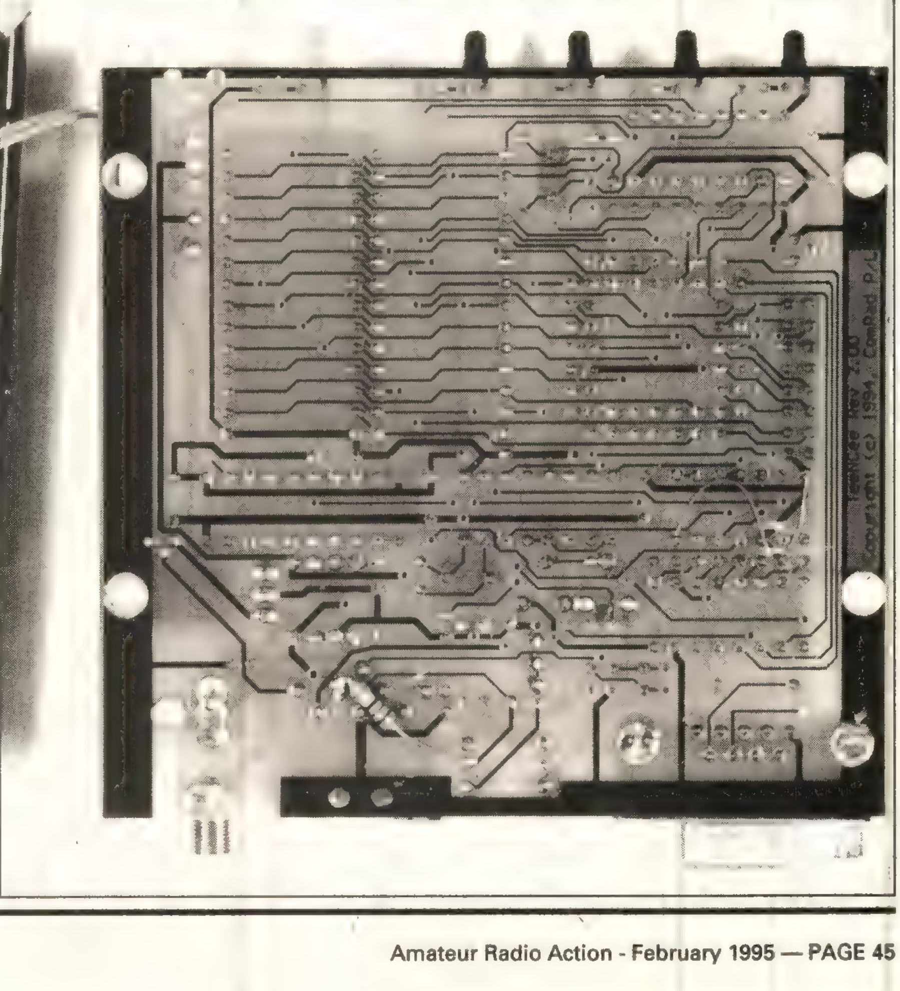

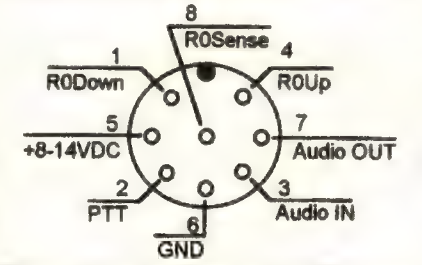

Figure 2: Rear panel view of 8 pin DIN socket

note the position of VR2 as the MSG LED is fully lit. Keep turning VR2 until the MSG LED is fully extinguished. The correct position for VR2 is mid-way between these two points.

Alternatively, if you have access to a CRO you may monitor the signal on pin 8 of the TCM3105 and adjust VR2 so that the observed signal has an equal on to off ratio.

To stop the calibration mode of *TeeNCee* type cal off and remove the short from the pin header.

Now you need to connect *TeeNCee* to your radio. You will need a DIN5 or DIN8 plug and a four-core cable. You will also need to have access to a connection diagram for the microphone socket and/or the speaker/audio output of your transceiver.

(See the **connections** section of this article for connection procedures.)

After connecting your transceiver to *TeeNCee*, you will need to tell *TeeNCee* your callsign. (No communication will be successful without it). Type **mycall** at the cmd prompt, followed by a space character, and then your callsign and then <CR>.

To ensure your call has been entered correctly, simply issue the **mycall** command without any arguments and *TeeNCee* will print its setting to the terminal. Okay, now you're ready to adjust the transmit signal level. This needs to be done in conjunction with a remote TNC, either a local repeater station or a TNC with digipeating.

Tune your radio to the same frequency as the remote TNC and issue a connect command to yourself — for example, for me to connect to myself via my local digipeater, I issue the following command:

connect vk2upp v vk2rpn

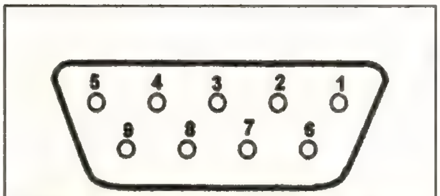

Figure 3: Rear panel view of D9 pin out

My TNC will now attempt to connect to itself, using vk2rpn as a packet repeater.

As each connect attempt is transmitted, you should observe the TX LED illuminate, and nearly immediately, observe the CD LED illuminate as the repeater re-transmits your packet.

You may observe the repeated packet transmission by setting **monitor**, **mall**, **mcon** and **mcom** all on. This is done by issuing the command (one at a time) at the command prompt, followed by a space, then type **ON**, then hit the enter key.

If you have installed a trim-pot in lieu of R12, monitor your transmitted signal with another radio and adjust the trim-pot for a "crisp" sound. If you have doubts about the quality of your signal, consult an experienced packeteer for their opinion. You should also observe reliable monitoring on your computer terminal of your own packets from the repeater station.

Final Assembly

Now, after completing the construction and calibration, the completed PCB assembly can be fitted into the housing.

Carefully locate the LEDs into their respective positions in the housing. You will have to hold the PCB assembly at the rear and at an angle to position the LEDs. Then simply drop the rear of the PCB into position. Now slide the PCB back toward the rear so that the four mounting holes in the PCB line up with the holes located in the housing base.

Ensure that the thread of the 3.5mm socket clears the rear panel — if it is touching, gently manoeuvre the PCB so that it clears the metal work (the thread of P1 is electrically different to the housing). Using self-tapping screws, secure the PCB into position.

Now the power switch may be mounted in the front panel. If possible, to prevent scratching of the front panel artwork, tighten the switch from the *rear* side of the front panel.

Finally, attach the top of the housing to the base with two self-tapping screws through the lower sides of the housing cover.

And... *now* yer ready!!

Connections

Connections to your transceiver are made through J1, the 8-pin DIN socket. If you aren't using the beam antenna rotator interface, you only need a 5-pin DIN plug for connection to your radio. A rear panel view of the connector and its pin-out is given in **Figure 2 (next page)**. Below is a description of each pin and its action:

DIN8 — J1:

Pin 1 - R0Down: This pin is a general purpose logic 5VDC output pin, which is not utilised with 'S' series EPROMs. Used in conjunction with 'B' series EPROMs, this pin will go active HIGH to drive an interface circuit for a directional beam antenna with a rotator, and the beam needs to be rotated 'down' (ie. toward 0°).

Pin 2 - PTT: This pin is active LOW open collector output. It is connected to the Push-to-talk input of the transceiver.

Pin 3 - Audio In: This input pin connects to the audio output of the transceiver.

Pin 4 - R0up: This pin is a general purpose logic 5VDC output pin which is not utilised with 'S' series EPROMs. Used in conjunction with 'B' series EPROMs, this pin will go active HIGH to drive an interface circuit for a directional beam antenna with a rotator, and the beam needs to be rotated 'up' (ie. away from 0°).

Pin 5 - +8-14VDC: This pin can be used as either input or output of DC power. If your transceiver has a DC voltage source @100mA available, then power for the TNC can be supplied to this pin. AC voltage *cannot* be fed through this pin. No power source must be connected to the 3.5mm mono socket (P1).

Alternatively, if you are using an EPROM series which requires an interface module (eg 'B' series EPROMs), you may take up to 100mA *out* through this point to your interface unit.

Power must then be supplied to the TNC through the 3.5mm mono socket (P1).

Note: This pin is *not* switched!

Pin 6 - GND: This pin is the ground reference for all signals to this connector.

Pin 7 - Audio Out: This pin is connected to the microphone input of the transceiver. The level output by the TNC may be adjusted with a 1K trim pot in lieu of resistor R12.

Pin 8 - R0Sense: This is a general purpose analogue/digital input. The input voltage must not exceed 5VDC nor go below GND. This pin is not utilised in 'S' series EPROMs. In 'B' series EPROMs, this pin is used to feed back the position of a directional beam antenna.

D9 SOCKET - J2:

The D9 socket is used to connect between *TeeNCee* and a computer terminal or PC. This socket has been configured to connect easily to an IBM or compatible computer serial port, using industry standard connectors and/or adaptors. Signal levels are 0V and 5V if wired for TTL, while using the U6 and associated circuitry, voltage levels are +10V and -10V. Pin descriptions are the same for either configuration and are as follows (refer to **Figure 3**):

Pin 1: Not connected.
Pin 2 - TXD: This output pin carries data from *TeeNCee* to the computer terminal. It should be connected to the computer RXD (receive data) input pin.
Pin 3 - RXD: This input pin is used to receive data from the computer terminal. It should be connected to the computer TXD (transmit data) output pin.
Pin 4 - NC: Not connected.
Pin 5 - GND: This is the signal ground pin. It must be connected to the computer terminal's signal ground pin.
Pin 6 - DTR: Data Terminal Ready. This output pin is used to indicate to the computer terminal that the TNC is ready. It is normally connected to the computer DSR input pin.
Pin 7 - CTS: Clear to Send. This input pin is used when hardware handshaking is activate (xflow set off) and indicates to *TeeNCee* when the computer terminal is ready to accept more data. It is normally connected to the computer terminal RTS output pin.
Pin 8 - RTS: Request to Send. This output pin is also used when hardware handshaking is active (xflow set off) and indicates to the computer terminal that *TeeNCee* can accept more data from the computer terminal. This pin normally connects to the computer terminal CTS input pin.
Pin 9 - NC: Not connected.

3.5mm SOCKET - P1:

If you opt to supply power to the TNC via pin 5 of J1, you must not connect a power source to the 3.5mm socket. Alternatively, if you choose to supply power via this socket, you can supply 8 to 14 volts, either AC or DC. An internal full-wave bridge rectifier means that P1 is not polarised. For this reason, I again emphasise my earlier note of caution — be absolutely *certain* that the mounting thread of P1 is ***not*** connected to the housing of the TNC, as these points are electrically different!

Troubleshooting

Before commencing troubleshooting of specific problems outlined below, check for visible short circuits or solder bridging between pads on the PCB. Also, check that all components have been correctly polarised and located in their correct circuit board locations. Particular attention should be given to the polarity of the EPROM.

No power LED

First check the polarity of the power LED, L5. Next, check that the power supply components D1, D2, D3, D4, and C7 are correctly polarised. With the power switch set to OFF, install your external power source into P1.

Measure the voltage across C7, where a voltage of between 8 and 14V DC should exist. If the voltage is less than 8 volts, the voltage regulator cannot work properly.

Voltages of greater than 14V can

....☞

LIST OF MATERIALS

Q:	VALUE:	COMPONENT LABELS:
4	22PF Ceramic Cap.	CI C2 C3 C4
8	0ul Mono Cap.	C5 C6 C9 C10 CI I C12 C13 C14
1	100uF 25V Electro. Cap.	C7
5	10uF 16VTant. Cap.	C8 C15 C16 C17 C18
5	IN400x Diode	DI D2 D3 D4 D5
1	DIN8 PCB	JI
1	DB9 PCB R/A Female	J2
1	2 Pin Header	J4 J5
4	Red LED	LI L2 L3 L4
1	Green LED	L5
1	3.5MM PCB SOCK	PI
2	2N4401 Transistor	QI Q2
1	IMΩ 1/4W 5% Res.	RI
5	560Ω 1/4W 5% Res.	R2 R3 R4 R5 R6
1	47KΩ SipRes.	R7
2	3K9Ω 1/4W 5% Res.	R8 R9
3	4K7Ω 1/4W 5% Res.	R10 R13 R14
2	IKΩ 1/4W 5% Res.	R11 R12
1	SOCKET PLC52	SKTU1
1	SOCKET DIP28	SKTU5
1	SPDT Switch	SW1
1	MC68HCI IAIFN	U1
1	MC34064	U2
1	74HC573	U3
1	62C256 RAM	U4
1	27C256 EPROM	U5 ComRad Part No: 9409-'S'
1	MAX232	U6
1	TCM3105 Modem	U7
1	74HC00 QuadNAND	U8
1	74HC595 S/P +Latch	U9
1	7805 Voltage Reg.	V1
1	100K Trim Pot.	VR1
1	10K Trim Pot.	VR2
1	7.3728Mhz Crystal	X1
1	4.4336Mhz Crystal	X2
1	PCB	ComRadPart No: 9408
I	Housing	ComRad Part No: 9410
6	4G Self Tapping Screws	

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cause thermal shutdown of the voltage regulator without adequate heat sinking. Now remove your external power source.

Next check that all semiconductors and polarised components are correctly inserted.

Check that pin 1 of each chip is correctly oriented, that transistor packages are correctly oriented, and that the positive lead of each capacitor is correctly placed.

Next check that there are no short circuits between pads or tracks on the PCB. You will require a multimeter set onto a low ohms range. All components inserted correctly should give a reading of about 500Ω across the power rails.

No sign-on copyright notice

Start by sweating over a multimeter and check that the cable connecting *TeeNCee* to your computer terminal is correctly wired.

If you built *TeeNCee* using the TTL configuration of the serial port, ensure that no short circuits exist between the 100Ω resistors inserted in lieu of U6 and caps; otherwise ensure that all the capacitors associated with U6 are correctly polarised. If all the above is okay, next ground the negative lead of your multimeter and check the voltage at pin 4 of R7 — the SIP resistor. You should read about 5V. If not, check that R7, U2 and U1 are all correctly polarised.

Also, if you have access to a CRO, check pin 9 of U8 for the clock frequency of 7.3728MHz; if no frequency exists, check that R1, C1 and C2 are correct.

Another possibility is that the TNC has entered KISS mode.

If you have an IBM PC or compatible, ensure *TeeNCee* is connected to your COM1 port and insert the diskette accompanying the kit, and start the program **NOKISS.EXE**.

This will take *TeeNCee* out of KISS mode. You will then need to power off *TeeNCee* and power on again to reset it.

TX LED lights, but no connections to other TNCs

First, ensure that you have set your callsign by issuing the **mycall** command, followed by your callsign. Without this being set, no one will know who is transmitting the packets! If you have a hand-held, grab it and listen to your signal to make sure the TNC's audio is making it to air. If you are able to communicate with other TNCs but find that the transmissions are irregular, you may be overdriving or underdriving the input to your transceiver.

Again, this can best be corrected by listening to your transmissions on another radio — or better still, ask a friend experienced with packet transmissions to listen to your signal as its transmitted by *TeeNCee*.

The output signal from *TeeNCee* is determined by the ratio of R9 and R12. If you wish, you may change the resistor in R12 for a 1K side-adjust trim pot.

This will allow easy adjustment of the output level driving your radio's microphone circuitry.

If you find that the trimpot adjustment is too 'touchy', you may change R9 to 39K as well. This is ideal for radios with high impedance microphone inputs.

Further Reading and Reference

A book which may assist with an introduction to packeteering can be found for a low price from, of all people, Tandy Electronics.

Entitled *Digital Communications with Amateur Radio*, it was written by Jim Grubbs, K9EI.

This book covers digital radio communication from Morse up to packet procedures, and is targeted at those without previous exposure to packet radio yet wish to get a packet station up and running. The development of packet radio can be followed by reference to the International Conference Papers published by the ARRL. These are available from the various Wireless Institute of Australia offices, or from their importer Daycom in Melbourne.

To find out more technical information about packet radio you may wish to consult *AX.25 Amateur Packet-Radio Link-Layer Protocol - Version 2.0, October 1984* published by American Radio Relay League; available from Daycom, the importer, the Wireless Institute of Australia, and Dick Smith Electronics. This book though is targeted primarily at the techno-junkies who wish to know the specifics about the bits and bytes that are actually transmitted on the airwaves.

Thanks...

Finally, tribute must be made to at least a few packeteers, without whose invaluable assistance a project of this magnitude could not have achieved success: **Dave Walmsley**, **VK2XPX**, for loads of guidance and information; **Maurice Jones**, **VK2CD**, for testing and advice; **Fred Lawler**, **VK2SI**, and **Peter Browne**, **VK2GFE**, for persistence, patience, endless hours of testing and advice. Also, many thanks to those not mentioned for their time and assistance.

GONE TROPPO...by Christopher Davis, VK1DO

By the time you read this month's column, we ought to have enjoyed a large part of the summer VHF season. I hope that you have had an opportunity to dabble with some of the impressive conditions which abound during the summer. Bear in mind that the Ross Hull VHF Contest is still running throughout January and guarantees to keep band activity strong.

This month I intend to deal with the constant dilemma which faces newcomers to VHF — what Yagi should I use? Which brand of commercial Yagi should I buy? Which design should I build? Can I build a better Yagi than the ones available commercially?

It is not my style to endorse a particular commercial Yagi. There are certainly some excellent brand names, with manufacturers refraining from ludicrous claims regarding gain; however, the published data from some manufacturers defies the proven limits determined by scientific research.

Try to remain scientific in the consideration of *any* antenna, either commercial or home-built. Regardless of who has designed a Yagi, who has tested it and so forth, the gain is simply related to the boom length. Building a 12-element Yagi on a three-metre boom for two metres will not and *can* not perform as well as a properly-designed 12-element antenna on a boom which is twice as long. The inclusion of numerous elements on a close-spaced boom might offer a wider bandwidth but it doesn't produce anything like the gain often claimed. Manufacturers are awake up to the delusion some customers suffer in simply looking for the maximum number of elements for their money. It's what I call a 'high impression ratio'...

Check an antenna handbook or even your ARRL Handbook. Examine and absorb those curves which show boom length in wavelengths versus gain. These are reliable constants which are the physical limits obtainable in an ideal situation.

The various designs of antenna might vary in terms of bandwidth, front-to-back ratio, cleanliness of pattern and so on. The limitations which constrain each design in terms of gain are unavoidable facts of life.

A simple rule of thumb to give you a mind's eye picture of gain and how it increases with larger Yagis, is to think of a three-element Yagi as approximately capable of slightly more than 6dB of gain over a dipole.

To gain a theoretical improvement of 3dB, or to double the gain, the Yagi has to be doubled in size, making it six elements. To gain the next increment of double the gain, the antenna becomes 12 elements.

It must be emphasised that these are theoretical possibilities which are often not obtained in practice due to the increased losses and cumulative errors which are unavoidable in larger antennas.

Suffice to say, an objective examination of many published antenna gain figures will leave you feeling dubious about the manufacturer's gain figures.

Much of the enthusiasm for one design versus another often relates to the simplicity with which the design can be duplicated by a home-builder.

What Yagi, what brand, what design? or can I build a better one anyway?

One generalisation which has been confirmed by numerous home-builders is that a gamma match becomes increasingly difficult to contend with at and beyond 144MHz.

Antennas which use a folded dipole feed with a four-to-one balun are most consistently replicated with high levels of satisfaction.

My enthusiasm for home-built antennas is twofold. Firstly, the construction of antennas is one of the areas of our experimental hobby which is still readily available to everyone with quite forgiving results. Secondly, and probably more importantly, home-built antennas are likely to cost a third of commercial designs and have every chance of performing as well or better.

The age of computer-aided design is making itself felt in the area of long-boom Yagi construction, with excellent programs available in the public domain.

These programs offer the selection of boom diameter, element diameter and other options with a very accurate estimate of the resultant gain to be expected.

They *work*, too!

If you are able to interest others in the project of building some Yagis there are many mutually beneficial advantages. Pooling your resources of tools, transportation of materials and bulk buying as well as the inherent advantage of working together in drilling booms and cutting elements will make the task efficient and enjoyable.

The ready availability of 6.5 metre lengths of 32mm aluminium forms an excellent basis for Yagis around 12 elements in length for the two metre band.

This would be a very respectable antenna for troppo work.

Without specifying designs, a few general comments might assist you with construction of any Yagi. Try to drill more than one boom at once, taping the booms together so that they naturally lie in the same plane as you drill repeated holes.

Obviously a drill press is a great boon in this area.

Make certain that your element holes are as close to the center of the boom as you can manage to keep the elements straight.

Using an insulator to mount an element above the boom might add to the cost, but it does simplify construction and offers long-term durability.

Having built an antenna with a good match, consider filling the feed box with some sort of expanding foam to remove oxygen and possible moisture, and you will also strengthen the joints against the fatigue of vibration which often affects antennas which are subjected to the wind.

This foam is available in boating shops either in a spray can or in two parts within metal cans.

Another source is your local hardware store — look for the 'gap sealer'-type products.

But before you cover your antenna with foam, do a simple experiment with about 25ml of the mixture to see how much it expands inside a glass jar. The expansion defies the imagination!

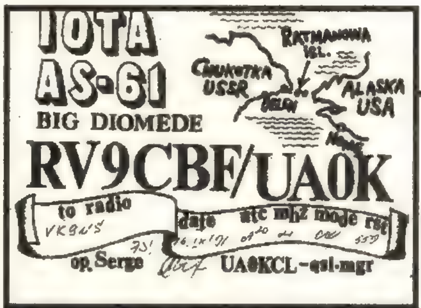
If you have had little success with other radio-related projects, antenna construction in the VHF arena will give you a valuable injection of confidence and satisfaction.

Don't fall into the trap of leaving your home-built antenna incomplete in any way which will affect its durability.

Don't underestimate the susceptibility of antenna feed systems and feedlines to the affects of sunshine and moisture ingress.

A little extra time in completing the fine details will be rewarded for many years in terms of performance and durability.

Happy building!



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DX & BAND REPORT

I will take this opportunity to wish you all a prosperous and happy New Year. Here I am writing my last DX column for 1994 in its dying days, and in a few short days 1995 will be here. Time certainly flies along — and propagation conditions continue to be very poor in a general sense.

However, it is also true to say that QSOs are being made which some years ago would have been all but impossible. It is easy, when operating on a day-to-day basis, to forget just how the efficiency of our stations has improved over the years.

SSB, of course par for the course these days, gave the radio amateur a tremendous boost in communication capability. We can copy signals today down to receiver noise floors which almost defy description and, with DSP filtering, a completely new game emerges.

What I am trying to say is that it is important that you *call CQ* even on an apparently dead band, and make use of your station capability. Trying to improve one's station is the heart of amateur radio and it is surprising what a few extra radials under that vertical can do. Getting that antenna a bit higher can really make a difference, and so on. Moving down to the lower frequencies can be an eye opener if you are new to 40 or 80 metres.

It is noticeable that 20 metres opens up quite late, and the usual time slot for the 14,222 kHz DX net is really much too early. In any case, at this time of year we have little contact with the USA around 0300-0700 UTC, but that will change.

Palestine ZC6

Well, there I was, minding my own business, listening on 14,260 kHz, the IOTA Channel, when up pops **ZC6B**. ZC6 I remember from the old days and, as you may know, the prefix ZC indicates a connection with the UK.

We also know where ZC4, ZD7, ZD8, ZD9 and, a bit nearer to home, ZL are. ZC6 was at one time the prefix for Palestine, and was also a DXCC country. It was deleted in 1968 and only QSOs prior to 1 July, 1968 count for DXCC.

When all the fuss had died down and I finally worked Sami, ZC6B, I felt that we might have a new country or at least a re-instatement of a country. We all know the story of Palestine and the current changes in the political scene in the area.

Sami is a doctor in Gaza City and, by all accounts, there are two stations licensed — ZC6A and ZC6B. ZC6A has not been active (as I write this) since the holder was in Norway attending the Nobel Peace Prize ceremonies.

QSL Route:
Dr Sami Tarazi, ZC6B,
PO Box 1008,
Gaza City,
Palestine.

Chatham Island ZL7

Ron, ZL1AMO showed up more or less on time and is currently signing **ZL7AMO**. He has been very active on all bands and was very loud on 20 metres RTTY the other evening.

QSL Route: **ZL1AMO** CBA.

DXCC

A few days after getting the last column off I received an ARRL release which covered the recent DXAC meeting and voting on DXCC issues. The following results were given:

1. Marquessas Islands NO. Vote was 14-2 against.

2. Astral Islands NO. Vote was 14-2 against. The decision was based on the view that French Polynesia is not a Point 1 country.

3. Balleny Islands NO. Vote was 13-1 against. This decision was based on the view that the Balleny islands are part of Antarctica.

4. Special DXCC award for mobile operation. NO. Vote was 14-2 against. The decision was based on the view that it would be impossible to verify that a QSO had been made whilst operating mobile.

DXCC processing status

At the end of November the number of unprocessed DXCC applications was 138 with a total of 15,248 QSL cards.

328 applications were received during the month with a total of some 29,441 QSL cards.

QSL manager

In a short note, Fava Paolo, **IK2PQR** informs me that he is QSL manager for the following stations:

BU6MM, E02CWO, EW6WW, EX8MF, II2R, RL0O, UC2WO, UCIW-WO, UL70B, UL0OB, UM8MFO, UN20, UQIGXZ, YLLXZ.

Antarctica

With the summer season around there is quite a bit of activity from down south.

Several VP stations are active from the Falkland Islands. It is reported that **DL7VTS** is on a scientific expedition to Ardley Island until late February 1995. He expects to be active as **DP1KPI**.

QSL routes: Home Calls.

Eddie De Young, **VI0ANT** is finding conditions are beating him in trying to make QSOs during his periods of activity. He is really hoping that propagation will pick up.

QSL Route:
Eddie De Young,
131 Plaintain Road,
Shailer Park,
Queensland 4128

UAR A6

The UAR has always been a tough country to work, however things are on the move in the UAR. Don, **WB2DND** reports that three new licences have been issued:

A61AH Al Mur Al Mohri
PO Box 4800 Dubai UAR

A61AN Nasr Fekri
PO Box 53656 Dubai UAR

A61AI has also been issued, no name yet.

New Caledonia FK

Several JA stations are active as I write this, signing own call/FK. eg **7KIWLE/FK** has been very active on 160 metres and so on. Equipment being used is very modest but **JM4WBB**, **JN4BSH**, **J01IST**, **JP1LHT** and **7K1WLE** are all active.

QSL Route: **7K1WLE** for all stations

Compiled by Jim Smith, VK9NS
PO Box 90, Norfolk Island, South Pacific 2899

Saudi Arabia 7Z

I worked Ibrahim, **7ZIIS** the other afternoon on 20 metres SSB on the long path. There have been problems with QSL cards for Ibrahim via OE6EEG so he now has a new QSL arrangements:

QSL Route: SM0OFG

Egypt SU

I worked Mohamed, **SU2MT** on 20 metres SSB the other day, quite late at 0750 UTC via the long path. He had a good signal and SU is not a common DXCC country on the bands.

QSL Route: callbook address

Bangladesh S21

It was quite a surprise to work Andrew, **S21YE** the other evening at 1000 UTC. I recognised the voice but had not realised he was back in Bangladesh. I first met him on an earlier trip to Bangladesh.

Then he had been in the country for five years and 'no license' was the word.

On return to Bangladesh some months ago he was issued with S21YE on a week-to-week basis. He reports that his license is now on a permanent annual basis, thus solving the hassle of that weekly renewal process. Expect Andrew to be reasonably active.

QSL Route: G0EHX

Glorioso FG/G

FR5ZU/G has now gone QRT. His place has been taken by **FR5ZQ/G** and he should be there until early January. Many VK/ZLs need this one and FR5ZU/G has checked into the Southern Cross DX Net a couple of times.

QSL Route: **FR5ZQ** via callbook address.

Syria YK

Glenn, **W60TC**, reports that the recent **YK0A** operation was 'involuntarily' terminated at 0800 UTC on November 29, 1994, by order of the Syrian Government.

It seems that the country's customs department wanted to check that all the imported equipment was actually *leaving* the country, and it required a couple of days to do this. All equipment was then bonded prior to actual departure.

Equipment problems, inter-station interference and some minor operator illness did not allow operation at full capacity. Propagation to the west coast of the USA was apparently poor, and a few of their fellow Californian amateurs did not make it. YK0A was very loud here, but unfortunately I missed them on 80 metres.

No QSO count has been released to date, but if it comes to hand I will give it next column. The YK0A QSL cards are already printed and being mailed.

QSL Route: W60AT

Tunisia 3V8

As far as I am aware, the **3V8BB** operation should be okay at DXCC so that is good news, however wait and see.

Further good news has a couple of the JA operators still in Tunisia and assisting with 3V8BB, however I have not heard them recently. Word is also about that Karl, **DK2WV** hopes to be back in Tunisia soon signing 3V8W. The last operation by Karl from Tunisia was accepted for DXCC credit.

Zaire 9Q

There is quite a bit of activity from Zaire these days, mainly from members of the UN contingent in the country. **LA9IY** is signing **9Q51Y** and is in Zaire for three months. 9Q5IY runs a modest station using an Icom IC-726, wire antennas and prefers CW.

QSL Route: direct only.

LAIK,
Acamdemic Radio Club,
Studpost 250 N-7034,
Trondheim,
Norway.

NB **9Q5BB**, **9Q5EXV** are also reported to be active.

Rwanda 9X

In a similar way to Zaire, activity from Rwanda is also fairly high at the moment. Alex, **PA3DZN** is now licensed as **9X5EE** with license number 0001. I do not have the QSL information yet as Alex changed his address recently.

South Georgia VP8

Patrick, **VP8CID** and wife Sarah, are both reported active from the South Georgia group. For example, the other day Patrick was on 40 metres SSB at around 0200 UTC. This time slot is too early for VK/ZL on 40, however it is nice to know that they are active, as South Georgia has always been a rarish one. No QSL details yet.

Kermadec ZL8

Kermadec is pretty high on the wanted list and there are persistent rumors about Barry Fletcher, **ZS1FJ** **(G4MFW)** going there in early 1995. According to a release by Barry, he has a license for Kermadec and a QSL manager arranged. A couple of points — it is very easy to get a reciprocal license for ZL with a G license. G4MFW/ZL would be a typical allocation. However, such a license would not be valid for Kermadec, ZL8 operation without a permit to land on the island and permission to operate amateur radio. It remains to be seen whether an application for such a permit has been made, as without it no operation is possible. Stay tuned...

Iraq YI

I recently mentioned working **YI9CW** and I had no idea about QSLing. A fast QSL card is apparently available from **DF3NZ**.

QSL Route: DF3NZ

....☞

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2 ele Delta loop.	$198
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DX & BAND REPORT *(continued...)*

North Cook Islands ZK1

ZL2HU is currently on Puka Puka Atoll signing **ZK1KH** and this counts for North Cooks. He operates SSB only but promises to try most bands.

QSL Route: **ZL2HU**

Myanmar XY

I think our old friend VR8B was 'at it' the other day signing **XY1XX** on 15 metres CW. He was very loud here and *no*where near Myanmar! He would not QSY to SSB and did not have much to say when asked why he was not XY1AA. Asking for QSL cards to JA1UT... I would simply forget it.

There was a recent note in DX outlets that JA1UT had been in Yangoon and had given a demonstration of amateur radio. So our 'friend' obviously reads the DX news...

Somalia 6O

What are we to make of Sam Voron, **VK2BVS**, signing **6O0A** from Somalia?? I have listened with amazement as he advertises the commercial activity of a proposed Somali station on the broadcast bands. The station will be on this frequency or that frequency, and if the first frequency is already in use another will be tried and so on.

I worked him on 40 metres SSB the other morning and could not believe his signal — 2kW to a log periodic was his answer to my question. "What amateur radio licensing authority permits 2kW?" was my next question. Answer: "Actually, I have authority to run 10kW but I can't afford the price of the linear." Tough, was my immediate reaction.

I do not like this 'five IRCs' routine for, quote, "...a QSL, plus a copy of my 6O0A license, plus a copy of a handout. Will 6O0A count for DXCC?? A very good question indeed...

Vietnam XV

Good news is that Rolf, **SM5MX** now has a license to operate from Vietnam. Signing **XV7SW** he is permitted to operate on the following CW frequencies; 3503, 7033, 14,016, 14,021, 21,016, 21,019, 28,016 and 28,019 kHz.

It is not clear from his release if he has permitted SSB frequencies or no but prefers CW operation only.

Rolf also states that new legislation on amateur radio is also due to be passed in 1995 and will bring Vietnam into line with other countries in the region.

QSL Route:
Rolf T Salme,
Embassy of Sweden,
Box 9,
Hanoi,
Vietnam.

NB **UA0FM** is also in Vietnam until mid 1995 and is trying to get a license.

Slim

Rudi, **DK7PE** wants it to be known that **ST0CW** and **SU2CW** who were active in November giving his call as manager, were both slims. Do not waste money on QSLing Rudi who has, of course, operated from many DXCC countries.

Gambia C5

Problems with **C56/G0MRF** and his QSLing address not being listed in the 1994 call book have been resolved.

QSL Route:
Direct cards go to **G8PDW**
Buro cards go to **G0MPF**

So that is about it for the moment. I have been very active on the low bands and have had some good openings to Europe in my mornings and also at around my sunset times.

I keep an ear on 17 metres, and there is quite a bit of activity there, with some good DX available from the African region.

Generally there is always something on the bands, and it pays to tune around and also have the odd CQ. OSCAR 13 activity continues and gradually the QSO count is building up.

To the many who keep me in touch with DX activities by fax, phone and letter, many thanks — your input is always appreciated.

I hope that 1994 has been a good year for your DXing activities and that 1995 is even better.

While things are a bit quiet get those cards off to ARRL, DXCC. They come back very fast these days! I have the necessary applications forms here...

A special thanks is due to the following DX outlets which keep the DXer informed: **QRZ DX**, **RSGB DX News Sheet**, **Long Skip**, **JA 59 Magazine**, **JA DX News**, **Les Bacores DX**, **Lynx DX Bulletin**, **ARRL DXCC Desk**, and others.

Happy new year! 73 de Jim, VK9NS

ISLANDS ON THE AIR (IOTA)

By Jim Smith, VK9NS, PO Box 90, Norfolk Island, South Pacific 2899

In the world of IOTA, the poor band conditions are also being felt quite badly. There has been plenty of activity and even a few brand new IOTA numbers issued — more of this in a moment.

The toughest one for me was trying to work VK8GAV on Alexander Island; it reminded me of the hours chasing a needed DXCC country. The time spent on Gavin was considerable but I finally managed a CW QSO with him, as did Dusty, ZL2VS, Ramon ZLIARY and a couple of other Pacific island chasers. The opening was very short and only lasted about 20 minutes.

Alexander Island is a new Antarctic number AN-018 and is little letter b) in the Antarctic listings in the IOTA Directory.

Nearer to home, with the issue of the new IOTA Directory, Stewart Island became a new South New Zealand listing. It was good to hear Carol, ZL1HS and Frank, ZL4TT activate Stewart Island. Despite very poor band conditions (they are pretty far south down there — next stop Antarctica) most of the usual IOTA gang made the QSO.

Stewart Island was quickly allocated OC-203 after meeting the QSO/Country total count.

AF-004	EA8BZH	Canary Islands	QSL Buro.
AF-005	D44BS	Cape Verde Islands	QSL CBA
AP-011	FR5ZU/G	Gloriosa Island	QSL Routes: ASIA to JA8FGG; EU/USA to VE2NW
AP-001	FR5ZQ/G	Gloriosa Island	QSL FR5ZQ
AF-023	S92SS	Sao Tome	QSL Route: S92SS, PO Box 522, Sao Tome, Sao Tome E Principe, West Africa.
AF-048	3B8FG	Mauritius	QSL CBA
AF-048	3BS/F6HWU	Mauritius	QSL F6HWU
AN-007	VP8CID	South Georgia Group	QSL: no details
AN-007	VP8CGE	South Georgia Group	QSL: no details
AN-018	VP8GAV	Alexander Island	QSL GM0LVI
AS-003	4S7/JA4FM	Sri Lanka	QSL JA1FAK
AS-013	SQ7BX	Maldives	QSL I4ALU
AS-019	9VLZV	Singapore	QSL CBA
AS-030	JD1BIK	Ogasawara	QSL CBA or JARL
AS-030	JD1AMA	Ogasawara	QSL CBA or JARL
AS-098	YM0I/P	Kara Island	QSL SP8BIA
AS-115	TA0/UY5XE	Anatolia Region South	QSL SPSBIA
AS-118	9K2F	Faylakah Island	QSL 9K2MR

NB There is some doubt whether YM0I/P was on the correct Kara Island to count for AS-098, and he may have actually been on AS-115.
A decision is awaited on this one.

EU-001	SV5AZP	Dodecanese	QSL CBA.
EU-109	G0OWE/P	Farne Island	QSL G0OWE
EU-109	G0KJW/P	Farne Island	QSL G0KTW/P

NA-021	8P9GD	Bermuda	QSL KU9C
NA-021	SP9GE	Bermuda	QSL K2PF
NA-033	HJ0VGJ	San Andres Islands	QSL Route: HJ0VGJ, PO Box 852, San Andres, Columbia, South America.
NA-034	K2OLG/P	Estero Island	QSL K20LG
NA-037	KL7FBI	Shimya Island	QSL Route: KL7FBI, Dave, C/0 Alascom, Shimya General Delivery, Shimya, AK 96512, USA
NA-080	C6AGN	Green Turtle Cay	QSL KA1DIG
NA-105	FS5PL	St Martin	QSL Route: FS5PL, BP 58, Marigot, 97051 Saint Martin Cedex, FWI, Central Algeria.

OC-023	AH9AC/AH3	Johnston Atoll	QSL CBA
OC-033	FK0P	Loyalty Islands	QSL F6AUS
OC-038	ZL7AMO	Chatham Islands	QSL ZL1AMO
OC-049	A35RK	Tongatapu Island	QSL KK6H
OC-073	JI7BCD/JD1	Minami Torishima	QSL via JARL
OC-077	KH8AF	Manua Island (Short operation)	QSL KH8AF
OC-086	AH9AC	Saipan Island	QSL CBA
OC-141	VK8BW	Groote Eylandt	QSL ZL2RR
OC-201	ZL1BAI	Great Barrier Island	QSL VK9NS
OC-203	ZLIHS/P	Stewart Island	QSL ZL1HS
OC-203	ZL4TT/P	Stewart Island	QSL ZLLHS

SA-023	PY6JJ	Bahia Center Group	QSL CBA
SA-026	ZZ5LL	Sao Francisco Island	QSL PP5LL
SA-078	HK3JJH/IF	Fuerte Island	QSL HK3JJH

The activity from Faylakah Island by **9K2F** was also a new IOTA number and was issued **AS-118** soon after the start of the operation. 9K2F was very loud here at around 1900 on 40 metres SSB.

The operation signing **HK3JJH/1F** was from Fuerte Island in the Sucre/Cordoba Division and was allocated **SA-078**.

I never quite understood the significance of the /IF and my computer logging program did not like it hi!

Despite poor conditions IOTA activity continues apace and quite a few IOTA Directories have been purchased in recent weeks.

Hope that you have had a successful year with the IOTA Program and that 1995 will be a good one for the island chasers.

73 from Jim VK9NS

SHORTWAVE LISTENING

All times are expressed in Co-ordinated Universal Time (UTC or 'z'). Add 10 hours for Eastern Standard Time, 9.5 hours for Central Standard Time, 8 hours for Western Standard Time and 12 hours for New Zealand Standard Time. Residents of states observing daylight-saving time should add one further hour to the above.

An ear on the world

Imagine the prospect of listening to foreign broadcasts for a living; an appealing notion to the average shortwave enthusiast no doubt, particularly if one were to be furnished with the latest receiving gear and access to a farm of antennas, all located in a pleasant semi-rural setting.

Such a place does in fact exist, at a place called Caversham, near Reading in England. For there lies the headquarters of BBC Monitoring, a generally unsung division of BBC External Services, which has the charter of listening to and analysing radio and television broadcasts from all over the globe.

Spawned in 1939 just prior to the commencement of World War Two, BBC Monitoring at its peak boasted close on one thousand employees, who initially directed their energies into transcribing transmissions from Nazi Germany, and thereafter overviewed the airwaves version of the Cold War.

Most of recent history has passed through the headphones of monitoring staff at Caversham, including Hitler's broadcast following the failed attempt on his life in 1944, and the imposition of martial law in Poland during 1981, the first real sign of Communist authority crumbling in Eastern Europe.

On the evening of August 20, 1968, it was clear that momentous events were in the offing in Czechoslovakia. At Caversham, The Czech monitor on duty in the evening worked back to hear the first news bulletin after midnight from Prague Radio, which in normal times repeated previous editions. His effort was justly rewarded, for at 0050z the following announcement was transmitted: "In a short while the Czechoslovak Radio will be broadcasting an extremely important news item. Stay at your receivers, wake all your fellow citizens.". What followed was the fearful news that troops of the Soviet Union, East Germany, Poland and Hungary had crossed the Czech border. Citizens were advised to remain quiet and offer no resistance.

The end of the Cuban Missile Crisis in 1962 saw dramatic use of the service, when it became a vehicle of high-level diplomacy. This crisis was, of course, brought about when the Russians commenced building missile bases on Cuba, the close Caribbean neighbour of the US.

After a period of great tension the Soviet leader Nikita Krushchev backed down in a message in Russian to President Kennedy, broadcast by Moscow Radio. "The Soviet Government," he said, "has ordered the dismantling of the bases and the dispatch of the equipment to the USSR. I appreciate your assurance that the United States will not invade Cuba." This was relayed from Caversham to the President, who replied immediately, despite receiving no written assurance at the time from Krushchev.

Such 'scoops' have been repeated many times until the present, but it is certainly not for the personal edification of BBC Monitoring's employees that listening activities are undertaken. Rather, BBC Monitoring is charged with the duty of supplying transcribed contents of the world's broadcasts to such bodies as the British Foreign Office, various wire services, news agencies, business and, not the least, the BBC's own news department. Many of the big world news stories that we hear about in our own media are originally sourced to BBC-M, which can mostly attest to the accuracy of its reporting by virtue of the fact that the information has originally come from the horse's mouth, as the old saying goes.

These days BBC-M has approximately 500 staff, many possessing linguistic skills. Together they monitor some 600 news programs per day, the content of which is recorded, transcribed, sifted and translated. The results are published in the daily 'Summary of World Broadcasts' (SWB), which is available on a transcription basis.

Monitors work in eight-hour shifts, and are assigned broadcasts to check at particular times, but their assignments are subject to frequent change. For example, their particular station may not come on the air at the usual time. This could be due to a technical fault, but may also be the result of a coup or major change in government policy. Thus, they go on listening until the reason becomes clear, and others may have to listen to the remaining broadcasts on their shift.

Aside from 'SWB', other less-frequent publications from BBC-M ('World Broadcasting Information' and 'Broadcasting Schedules') document news of changes to the broadcasting scene itself, and detailed frequency information concerning international broadcasters. Much of the content of the latter publications finds its way to the hobbyist community, though an airmail subscription is far from cheap: Australian subscribers don't get much change from $1,000 per annum. About 10 years ago it was possible to avail oneself of this service for about $100 per year, and the sometimes bulky envelopes were received on a weekly basis.

Technical facilities at Caversham are a DXer's dream: 100 receivers, coupled to more than 30 antennas (actually located at nearby Crowsley Park). Additionally, there are remotely-controlled receivers at strategic points of the globe, including Africa, the Middle East and Asia. As a result, there is very little happening in the world which BBC-M doesn't know about. Given the widespread locations of the world's trouble spots, BBC Monitoring has certainly over the years proven to everyone that keeping an ear on the bands is the next best thing to being there.

Thanks to BBC publicity department, 'Waveguide' and Shigenori Aoki for some background information.

A Christian voice for Zambia

On December 1 last, a selection of local dignitaries, including President Chiluba and the Zambian vice-president, witnessed the inauguration of Africa's newest shortwave station, constructed by the British concern, Christian Vision.

Compiled by Craig Seager
12 Pellion Place, Bathurst, NSW 2795

Situated 30 km from the Zambian capital, Lusaka, the 3,000 ha site of **Christian Voice**, as the station is known, houses a Continental 100 kW transmitter, feeding a TCI broadband non-directional antenna.

Right from the start, the Zambian government encouraged the project, which does not only involve shortwave transmissions, but also planned community facilities such as an orphanage, educational facilities and a Bible college.

Not unexpectedly, most 'Christian Voice' programming will have a religious slant, however there will also be segments concerning health, news and sports.

The primary language will be English, and a 24-hour schedule is planned in the future. Currently, the station is on air afternoon and evening hours (UTC), using 6065 kHz. Reception in Australia thus far has been good, though the frequency choice is hardly optimum, as both **Radio Yerevan** in Armenia and the powerful **Radio Sweden** use 6065 kHz during this period. Best results are likely from 1700-1900z.

In future months, other frequencies may be pressed into service. Of those mentioned to date, 4968 and 7250 seem likely.

From down-town Prague

Another new player on the bands is the Czech private station **Radio Metropolis**, which has until now been listed as an FM-only operation. Test transmissions commenced on shortwave in early December, with multilingual identification announcements and address details.

The transmitter site is believed to be located to the east of the capital, Prague, using relatively low-powered equipment which served to jam foreign broadcasts during the communist years. The announced initial schedule is:

0700-0755z on 9455 kHz to Eastern Europe
0800-0855z on 5905 kHz to Central Europe
0900-1055z on 9470 kHz to Western Europe and the British Isles
1100-1255z on 5905 kHz to Central Europe
1300-1400z on 5905 kHz to Western Europe
1600-1755z on 5940 kHz to South Eastern Europe
1800-1955z on 7250 kHz to the Middle East and North Africa
2000-2255z on 7305 kHz to North America
2300-0100z on 6200 kHz to North America

Attractive QSL cards are promised for correct reception reports, and there will also be draws for souvenirs and small prizes. The address is: Radio Metropolis Prague, Jeseniova 38, 130 00 Prague 3, Czech Republic.

Get this one while it's hot, folks. Experience has shown that commercial operations on shortwave are rarely viable, and I would not expect Metropolis to be favored with any government funding at a time when the survival of Radio Prague itself is threatened due to economic factors.

New booklet available

During the last two years, station **KNLS** in Alaska has provided more than 800 free copies of the Carl Mann book 'DX Tips for Beginners' to its listeners worldwide. Now Carl Mann and KNLS have again joined forces to produce a new free English language booklet titled '**DX Propagation for Beginners**'.

Carl wrote the booklet at the request of KNLS to help listeners improve their reception during the low-end of the 11-year sunspot cycle. The 16-page publication contains five chapters, being: **1**) Introduction to Propagation, **2**) Groundwave, skywave and the ionosphere, **3**) The radio spectrum, **4**) The solar cycle, and **5**) Understanding and using propagation knowledge. Charts and illustrations are also included.

'DX Propagation for Beginners' is available free from Station KNLS, Anchor Point, Alaska, 99556, USA. Two International Reply Coupons are requested to cover return postage.

The current transmission schedule for KNLS reads as follows:

0800z 7365 kHz English
0900z 7365 kHz Russian
1000z 7365 kHz Mandarin
1100z 6150 kHz Russian
1200z 7365 kHz Mandarin
1300z 7365 kHz English
1400z 7355 kHz Mandarin
1500z 7355 kHz Mandarin
1600z 7355 kHz Mandarin
1700z 7355 kHz Russian

This schedule remains effective until March 26.

Iran

Last issue we touched on a few frequencies where the **Voice of the Islamic Republic of Iran** might be heard in this part of the world. To expand on this, a complete schedule for IRIB External Service has come to hand from Pejman Pourmand, via the Internet.

English is listed:
2130-2230z 9670 kHz to Australia
0030-0130z 7100, 9670, 9022 kHz to the Americas
1130-1230z 7260, 9575, 11,790, 11,930 kHz to East Asia, 1224, 11,745 kHz to the Middle East, 702 kHz to North-west Asia
1530-1630z 9575, 11,790 kHz to East Asia
1930-2030z 1404, 7260, 9022 kHz to Europe

Transmissions in Arabic go out:
0230-0330z 7100, 9022 kHz to the Americas
0330-0730z 576, 1224, 9575, 11,910, 11,930, 15,315 kHz to the Middle East
0930-1130z 576, 1224, 11,745, 11,910, 13,605 kHz to Central Africa
1700-2130z 765, 1080, 1224, 6025, 7190 to the Middle East, 11,790 kHz to Africa
2130-2230z 7260, 9022 kHz to Europe, 6025 kHz to the Middle East

South Africa

In DSWCI 'Shortwave News', Wolfgang Buschel gives this schedule for South Africa's external service, **Channel Africa**:

0300-0400z Swahili on 6000 kHz (Monday to Friday)
0300-0430z Chichewa on 3955 kHz
0300-0500z English on 5955, 9585 kHz
0300-0400z French on 9655 kHz
0400-0500z Portuguese on 3975, 9655 kHz
0500-0600z English on 7185, 11,900 kHz
0500-0600z French on 9655 kHz
0500-0600z Portuguese on 11,750 kHz
0900-1000z Tsonga on 7225 kHz (Saturday/Sunday)
1000-1100z English on 17,810 kHz
1100-1130z Portuguese on 7225, 15,240 kHz (Monday to Friday)

....☞

SHORTWAVE LISTENING *(continued...)*

1100-1200z English on 9730 kHz
1130-1200z Portuguese on 15,240 kHz (Monday to Friday)
1400-1700z Swahili on 11,900 kHz
1500-1800z Lozi on 5955 kHz
1500-1800z Chichewa on 6120 kHz
1500-1800z English on 7225 kHz
1600-1700z English on 15,240 kHz
1800-2000z French on 7225, 9550 kHz
1900-2000z Portuguese on 3975 kHz
2000-2100z Portuguese on 7225 kHz

Whilst its own external service has contracted somewhat, Channel Africa has increasingly made its transmitters available to other broadcasters at its Meyerton complex, including:

The Voice of America
1800-1900z 4875 kHz (Monday to Friday)

The BBC
3395 kHz **1700-1730z**; 6070 kHz **1700-1730z**; 6135 kHz **0430-0600z**; 7125 kHz **0430-0500z**; 7230 kHz **1745-1830z**; 9515 kHz **0430-0600** and **1700-1730z**; 9610 kHz **0245-0330z**; 11,940 kHz **0530-0600z**; 15,400 kHz **0600-0730** and **1700-1900z**; 17,830 kHz **0700-0730z** and 21,470 kHz **1615-1700z**.

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Radio Deutsche Welle
3995 kHz **1800-2200z**; 5980 kHz **0500-0700z**; 6015 kHz **0300-0400z**; 7195 kHz **1500-1750z**; 9565 kHz **0900-0950z**; 9615 kHz **2100-2150z**; 9735 kHz **1800-2200z**; 11,720 kHz **1800-1850z**; 11,865 kHz **1900- 2050z**; 15,410 kHz **1000-1050** and **1400-1450z**; 17,800 kHz **1100-1350z**.

It is believed that Deutsche Welle's use of this relay facility will be phased out as its own site at Kigali (Rwanda) returns to full capacity.

Trans World Radio

The Christian broadcasting organisation **Trans World Radio** has announced that it has commenced broadcasts via South African shortwave facilities, beamed to both West and East Africa. Frequency details are not available at the time of writing, but this arrangement would supplement existing transmissions from TWR's own site at Manzini in Swaziland.

World of Radio schedule

There have been several significant changes to the schedule of this popular segment for shortwave listeners, and the following update should prove timely:

via **WWCR**, Nashville
Friday 2130z 12,160 kHz
Friday 2215z 15,685 kHz
Sunday 1030z 5065 kHz
Monday 0000z 7435 kHz
Tuesday 1330z 15,685 kHz

via **WHRI**, Noblesville Indiana
Friday 2130z 13,760 kHz
Saturday 0600z 7315, 9495 kHz
Saturday 1730z 13,760, 15,105 kHz

via **KWHR**, Hawaii
Saturday 1730z 6120 kHz
Monday 0330z 17,510 kHz

New Internet service

Germany's **Radio Deutsche Welle** advises in its latest 'Tune In' newsletter that program previews for Deutsche Welle TV and radio are now also available via the Internet and can be called up free of charge at the Internet address **www-dw.gmd.de**. As some of the program previews are extremely detailed, a summarised version is accessible using the code **ftp-dw.gmd.de**.

The station will happily respond to questions or comments sent via its e-mail addresses: **harald.scheutz.@dw.gmd.de** or **solbach@dw.gmd.de**.

Mongolia

A new 1992 constitution enshrining democracy has diminished Mongolia's previously-deserved reputation as a hostile backwater of the Communist world, though the world's largest land-locked and most sparsely populated country remains a bit of a mystery to most of us in the West. So too does the logic behind **Radio Ulan Bator**'s scheduling policy, which results in needlessly complex arrangements for airings of the English service, in particular. The following can be gleaned from on-air announcements:

0910-0940z on 12,000 and 7290 kHz to the Pacific
1445-1515z on 12,000 and 7290 kHz to South Asia
1930-2000z on 13,650 and 7290 kHz to Europe
1200-1230z (Monday and Wednesday) on 12,015 and 7290 kHz to the Pacific
1200-1230z (Thursday and Saturday) on 12,000 and 7290 kHz to the Pacific
0300-0330z (Tuesday and Wednesday) on 12,015 and 7290 kHz to North America
0330-0400z (Friday, Saturday and Sunday) on 12,000 and 7290 kHz to North America

Of particular significance are the North American broadcasts, a new innovation since November of last year.

India

Obtaining a transmission schedule from our friends at **All India Radio** can be a lengthy and thankless task, possibly due to India's widely-recognised penchant for maintaining a sluggish and multi-layered bureaucracy. Nevertheless, persistence pays off, and we are now able to feature the frequencies used for English in the General Overseas Service (GOS):

GOS I
East and South East Asia

Compiled by Craig Seager
12 Pellion Place, Bathurst, NSW 2795

2245-0045z 9705, 11,745, 15,145 kHz
North East Asia
2245-0045z 13,750, 9950 kHz

GOS II
North East Asia
1000-1100z 15,050, 17,895 kHz
Australia and New Zealand
1000-1100z 15,050, 15,180, 17,387 kHz

GOS III
South East Asia
1330-1500z 13,732, 15,120 kHz

GOS IV
East Africa
1745-1945z 11,935, 15,075 kHz
UK and Western Europe
1745-1945z 7412, 9950, 11,620 kHz
West and North West Africa
1745-1945z 9650, 13,750 kHz

GOS V
Australia and New Zealand
2045-2230z 9910, 11,715, 15,225 kHz
UK and Western Europe
2045-2230z 7412, 9950, 11,620 kHz

For a touch of *real* obscurity, try the Tibetan broadcasts from AIR, which go out from 0130-0200z on 11,880 and 13,750 kHz, and from 1215-1330z on 1134, 7412, 9565 and 11,585 kHz.

Uzbekistan

Wolfgang Buschel provides this useful schedule for **Radio Tashkent**:

To the Middle East
1520-1930z in Dari/Persian/Uzbek and Arabic on 7105, 7285 and 9540 kHz

Domestic Service relay (in Uzbek)
0330-1500z on 15,330 kHz,
0500-1500z on 16,165 kHz

To Europe
1930-2000 and **2100-2130z** in German on 5035, 5060, 7105, 11,905 and 13,800 kHz

To Asia
1200-1500z in various languages including English and **1200-1230** and **1330-1400z**, on 6025, 9715 and 13,785 kHz.
0100-0130z English, **0130-0200z** Dari, **0200-0230z** Pashto, all on 5955, 5975 and 7285 kHz.

This information from 'Shortwave News'.

News in brief...

- An odd assortment of programs continues to show up via transmitters in the CIS. One such is a German language religious spot via **Radio Minsk**, seemingly Fridays (UTC) only, 1930-2000z. This one is called '**Radio Fenster**' ('**Radio Window**'), with the best frequency in Australia 7105 kHz. You might also be lucky enough to hear Minsk's own English broadcast on the same frequency, Tuesdays at 1945z.
- A badly-misaligned transmitter of **Radio Pakistan** continues to lurk at the nether end of the 41 metre band, no doubt much to the chagrin of amateur operators. The frequency is close to 7084 kHz, heard best after 1130z. The location is believed to be Islamabad, presumably carrying some sort of domestic service relay (mostly in Urdu).
- Oddball Equatorial Guinean station, **Radio Africa**, has been making one of its occasional forays into the 19 metre band, a segment of the broadcast range in which it began in earnest before moving to graze on lower frequencies some years ago. Look for this one on 15,185.3 kHz, submerged under the **Voice of America** at 2200z. Programming is sourced mostly sourced from some off-beat US Christian organisations, who no doubt pay for the privilege, plus some more palatable groups such as the Salvation Army.
- New Guatemalan station, **Radio Coatan** (4779.8 kHz) may be a difficult catch at present, but watch for it as the year progresses. Although it's in the mud many nights, it was sometimes well over S9 in late December nights. This is another religious broadcaster, which you're most likely to catch after 1100z on good Latin nights.
- Daytime Asian signals remain in vogue for the coming month or so, but only for the very attentive. Look for marker stations **RRI Ujung Pandang** 9552 kHz and a weaker **Radio Vanuatu** on 7260 kHz. Other roses among the thorns include **RRI Sorong** on 9743 kHz approximately, **RRI Jayapura** 9612.1 kHz and the **Sri Lanka Broadcasting Corporation** on 9720 kHz. The recommended time span is 0000-0330z.

More news from the bands next month. I'll see you then...

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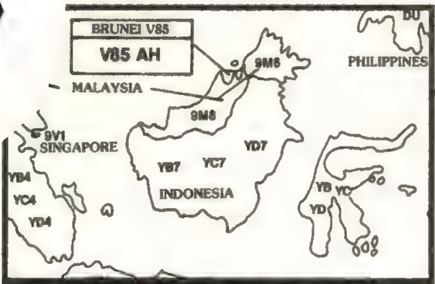

DX UPDATE
WHAT'S HAPPENING OUT THERE?

3V TUNISIA

3V8BB continues to be active. Reports from the "160 DX Bulletin" indicate that the club station was active on 160 meters. The bulletin also states that a native operator named Mohamed is now active using the club station. Recent spots were 7006 kHz at 2315z, 21290 kHz at 1500z and 14022 kHz at 1415z. QSL via JF2EZA.

9K KUWAIT

9K2MU has been active 3792 kHz around 0100z. George, DJ9LJ, has been with him to help control the pileups. QSL via WA4JTK.

A group from the "Kuwaiti Radio Amateur Society" operated from the island of "Fialka", which is located about 25 km northeast of Kuwait City. The operators 9K2QA, 9K2VV, 9K2GM, 9K2IC, 9K2DB, 9K2DR and 9K2YJ were active mid-December using the callsign 9K2F.

There will be a special QSL card available. QSL direct to 9K2RA with two IRCs or equivalent.

ANTARCTICA

Gavin, VP8GAV, has moved on to another British Base. He is currently at Fossil Bluff Base and can usually be found with a loud signal on 14024 kHz after 2300z. QSL via GM0LVI.

Eddie, VI0ANT, active from one of the Australian bases, has been active on RTTY. Look for him around 14083 kHz between 0100 and 0200z, and again between 1300 and 1500z. Eddie was expected to erect a beam in early December if the weather was good. QSLs for VI0ANT go via his home call VK4EET, Eddie DeYoung, 131 Plantain Rd, Shailer Park Q 4128, Australia.

EY (ex. UJ) QSL BUREAU

Nodir Tursoon-Zadeh, EY8MM, the Vice-president of TARL, advises that the Tajik Amateur Radio League QSL-bureau (EY/ ex. UJ) is Box 303, Glavpochtamt, 734025, Dushanbe, Tajikistan. He reports that during the past two years they have not received any QSLs from Box 88, Moscow. He recommends not to send cards to the Box 88 service for EY cards.

VP8 SOUTH SHETLANDS

The DXNL reports that starting in mid December Henry, SP3FYM, will be on the air as HF0POL (presumably) until the end of 1995. He will emphasize RTTY and 160 meters.

Andy, SP2GOW, is one of the operators now active from Smith Island in the South Shetland group as VP8CQS. QSL via DL1EHH.

JD1 MINAMI TORISHIMA

Ishi, JI7BCD, is currently active as JI7BCD/JD!1. His length of stay is unknown at this time. There has been two reported QSL routes:

1) JARL or 2) S. Ishizawa, 13-40 Sakuragichou, Mutsu, Aomori 039-51, Japan.

VP8 FALKLAND ISLANDS

Dave, VP8BKT, has been heard recently on 18153 kHz around 1830z. He has also been heard on 14184 kHz between 0000 and 0300z, and on 21290 kHz starting around 1700z. VP8CMP has also been active on 21290 kHz between 1300 and 1500z.

ZC6 PALESTINE

On Sunday December 11th, at approximately 1430z, a station was heard on 14243 kHz signing ZC6B stating he was operating from Palestine. The station was reported to be very weak in signal strength. Also, Dr. Selim, OE6EEG, was also on the frequency running a list of stations to work the ZC6B station.

He was also heard stating that he would run a list operation every Saturday and Sunday starting at 1400z on 14243 kHz for the ZC6B station.

The station's operator and QSL route is: Dr. Sami Tarazi, Box 1008, Gaza, Palestine via Israel. According to Dr. Selim, the paperwork for this operation has already been sent to the League.

EDITOR'S NOTE: ZC6 was deleted from the DXCC Countries List as of July 1, 1968. Also, the allocation list of international call signs shows that the prefix for ZC6 is allocated to the United Kingdom of Great Britain and Northern Ireland.

(From the ARRL DXCC Countries List, July 1994)

ZC6B GHAZA - and more...

Arie Surkiss (4X6UO), HF Manager of the I.A.R.C. recently stated the following: "According to the Israeli Ministry of Communication, Spectrum Manager Division, the Ministry has not issued such a prefix (ZC6B) and there is no Israeli involvement in this operation.

As far as I know the ITU has not issued a prefix to Ghaza or Jericho."

Meanwhile, Larry Price, W4RA (IARU Secretary), reports receiving a FAX from the "Palestine Amateur Radio Association", with information which may shed some light on the callsign being used. The FAX contained a newspaper article dated December 12, 1994 from the "Al Quds Newspaper" stating that the call was issued in 1948 to Dr. Sami Tarazi but never used because of the war that broke out.

Just before going to print, OPDX received an announcement stating that the Palestine Amateur Radio Club (Association) has invited JA1UT and JA3UB to help set up a station and operate next week. They will use their home calls /GAZA.

FT5X KERGUELEN ISLAND

Pierre, FT5XJ (F5NLL), was to leave the island on December 15th, but was heard on the 18th (DX net) 14226 kHz at 1415z. If Pierre departs later than announced, he will return to the island to be active between January and March of 1995.

KP5 DESECHEO

AB4JI, who planned a trip to KP5 last year, and after receiving approval, it was rescinded because of several guerrilla bands on the island, and the authorities could not be held responsible for anyone's safety.

Ray has recently inquired again on this matter, and the current position is that no amateur radio is allowed from KP5 at the moment. The authorities would not say one way or the other if there are presently people on the island, just a flat denial of operation from there.

QSL ROUTE

Daniel, 3A2LZ, reports the correct QSL route for his operations as

3A2LZ/0S0D and IK/3A2LZ/1P0D from Seborga is: Daniel Plett, B.P 349, MC98007 Monaco. He has the /0S0D QSLs ready but he is waiting for the /1P0D QSLs to come from the printer.

SPECIAL EVENT STATION

Members of the Jemtlands Amateur Radio Club (SK3JR), will be promoting Sweden as a possible candidate to hold the Olympic Winter Games in the year of 2002. Their special callsign will be 7S3OWG (Olympic Winter Games) and will be active from January 1st until June 16th. The station will mainly be active on CW but there will be some activity on the other modes and some participation in major contests. QSL via SM3CVM.

XR0 EASTER ISLAND AND SALA Y GOMEZ ISLAND (NEW IOTA)

Bob Schmieder, KK6EK, and Carlos Nascimento, NP4IW, have announced they are planning and organizing a DX/expedition to these two islands.

The tentative dates are August 26th through September 14, 1995. The amateur radio part of this project will include: activity on amateur radio, including activation of SyG for IOTA (a new one), low-band and digital mode operation, radio science including transequatorial propagation, beacons, and propagation predictability during low-sunspot conditions.

The scientific part of the project will include: the natural science, including collection of marine specimens (by diving), bird surveys, bathymetric charting, etc.; culture and history of Easter Island. Bob reports all permits are in place and they are planning to have a team of 24 operators to be active from both islands (12 on each island) simultaneously for 2 weeks (or longer).

Radio callsigns will be XR0Y (Easter Island) and XR0Z (SyG). The honorary Expedition Leader for this project is Thor Heyerdahl. Amateurs who have expressed serious interest or commitment include: KK6EK, NP4IW/6, KA3MUF, KD8IR, W6MKB, ON6TT, WJ2O, AB7BB, K9SJC, AA6KX, K1OCS, K1XM, KQ1F, WA5DAN, KD6ISY, and AA6TT.

SPRATLY

K5OVC reports that Robin, DU9RG, is planning to operate as DU0K sometime in April. According to the DXCC Desk, the Philippines are one of several countries with territorial claims in the Spratly group. Any operation from the Spratlys should use the call sign of the occupying authority.

QSL ROUTE CORRECTION

Wayne, WB6EQX, reports that he is receiving cards for 9K2MU. The correct QSL Manager for 9K2MU is WA4JTK.1P0 SEBORGA

Daniel, 3A2LZ, he states he has received operating permission for 1995. So look for him as IK/3A2LZ/1P0D usually on weekends operating CW, RTTY (until the laptop's battery runs out) and for some activity on the WARC bands. Daniel also mentioned if there are any RS-12 passes while he is in Seborga he will work them too.

OD LEBANON

Timo, OH1NOA, will be active as OH1NOA/OD5 until August of 1995. Activity will be on 80-10 meters including the WARC bands (he prefers CW). QSL via OH1MRR.

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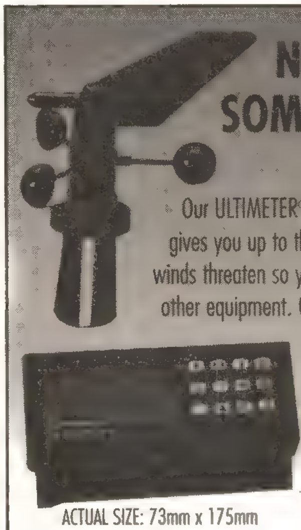

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Propagation

East - England (short path)

```
28.5
24.9         ..
21.2        .%%..
18.1        %%%%%.....
14.2       .FFFF%%%%%%%..
10.1              AFFFFF%%%
 7.2                FFFFFF
 3.6                 FFFFF
 1.8                 FFFFF
 0.9                 FFFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - England (long path)

```
28.5
24.9
21.2          ..
18.1          %%..      ..
14.2         %FFF%%AAA AA%%..
10.1        %FF
 7.2         F
 3.6
 1.8
 0.9
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

ABOUT THESE CHARTS

The data on these pages are graphs showing forecasts for expected HF operating conditions between Australia and a number of important DX destinations. The information they contain is prepared by **IPS Radio and Space Services**, a division of the federal Department of Administration Services. IPS monitors changing radio conditions - which are affected most greatly by fairly predictable changes in solar activity - and issues reports and warnings based on that data.

Stations in the eastern half of Australia should refer to graphs on the left hand page. The data on the right hand page is calculated for stations in the western half of the continent. Of course, if your location is in the middle of the continent try reading them *both* - then make an educated guess.

The horizontal axis of each graph represents the hour of the day expressed in Universal Co-ordinated Time or UTC ("z"). The vertical axis lists specific point frequencies within reach of each HF amateur band.

The maps are easy to read. First go to the map which looks closest to the area in which you are interested. Look *up* from the time and *across* from the selected band to the point at which the two variables merge. Note which symbol - if any - appears at the intersection of the particular time and frequency combination for that area and refer to the legend (right) to find the sort of propagation most likely to apply. If the space is blank the forecast is not good - your time and frequency combination is unlikely to allow communication to the destination station.

East - Central and East Coast USA

```
28.5
24.9                       ..
21.2 .                   .%%%.
18.1 %.            ...  .%%%F%
14.2 AAAA.  ....  .%%%..%AAAAA
10.1        %%%%%%FA
 7.2         FFFFFF
 3.6         FFFFF
 1.8         FFFFF
 0.9         FFFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - West Coast USA

```
28.5 ..                      .
24.9 ..%                   ...
21.2 %%%.                ..%%%
18.1 SSS%.           .  .%%%SS
14.2 AAAA%.  ......  %..%SSAAA
10.1        %MM%%%%%%S
 7.2         MMSSSSSS
 3.6         MMSSSSSS
 1.8         MMSSSSSS
 0.9         MMSSSSSS
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - South America

```
28.5
24.9 ....                    .
21.2 %%%%%%%.             ..%%
18.1 FFF%%%%%.  ..      .%%%%F
14.2 FAFFFFFF%..%%%%AA AAFFFFF
10.1        FFFFF
 7.2         FFF
 3.6         FFF
 1.8         FFF
 0.9         FFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - West Indies

```
28.5
24.9 .                     ...
21.2 %.                  ..%%%
18.1 F%.   ...    ...   .%%%FF
14.2 AAA...%%%.. .%%%.AAAAAAAA
10.1        FF%%.%A
 7.2         FFFFF
 3.6         FFFFF
 1.8         FFFFF
 0.9         FFFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - Japan

```
28.5 ..%%%%%%                .
24.9 %%%%MMM%. .             %
21.2 MMMMMMMM%.%           ..M
18.1 MMMMMMMM%%%.          %%M
14.2 MMMMMMMMSSM%.......  .SSM
10.1        SSSMSSS%%%%%..%
 7.2         ASMSSSSSSSS%%
 3.6          SMSSSSSSSSS
 1.8          SMSSSSSSSSS
 0.9          SMSSSSSSSSS
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - Central Europe

```
28.5
24.9        ...
21.2       .%%%..
18.1       %FF%%%.....
14.2      AFFFFF%%%%%%..
10.1              FFFFF%%%%
 7.2               AFFFFFF
 3.6                FFFFFF
 1.8                FFFFFF
 0.9                FFFFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - Middle East

```
28.5      ...
24.9     .%....
21.2    .%%%%%%..
18.1    %FFFFFF%%.....
14.2 . AAAAAAFFFF%%%%%........
10.1             AFFFFF%%%%
 7.2              FFFFFFFF
 3.6               FFFFFFF
 1.8               FFFFFFF
 0.9               FFFFFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - North Africa

```
28.5
24.9        ....
21.2       .%%%..
18.1       %FFF%%.....
14.2 .AAAAAAAAFFF%%%%%........
10.1                AFFFF%F
 7.2                 FFFFF
 3.6                  FFFF
 1.8                  FFFF
 0.9                  FFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - West Africa (short path)

```
28.5
24.9
21.2 .       ....           ..
18.1 %      %%%%%.        ..%%
14.2 F%.A.  FFFAAAAA..   .%FFF
10.1                   %%FA
 7.2                    FF
 3.6                    F
 1.8                    F
 0.9                    F
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - West Africa (long path)

```
28.5  .                      .
24.9 ....     .            ...
21.2 %%%..    ..  ...     %%%%
18.1 %%%%%.  .%%..%%..   %%%F%
14.2 AAAA%%. FF%%%AF%%...FFFAA
10.1        .F
 7.2
 3.6
 1.8
 0.9
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

East - South Africa

```
28.5
24.9        ....
21.2     ...%%%%%.
18.1     %%MMMMMM%.
14.2 ...%MMMMMMMMMM%%... .....
10.1                MMMMMMMA
 7.2                 MMMMM
 3.6                 MMMMM
 1.8                 MMMMM
 0.9                 MMMMM
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

forecaster Feb 1995

LEGEND TO SYMBOLS

- **.** Propagation is possible, but unlikely at this time and frequency on more than half the days of the month.
- **%** This frequency/time pair should allow communications on between 50% and 90% of the days of the month.
- **F** Your best bet: first "F" mode conditions should apply on at least 90% of days this month for the given time and frequency.
- **E** Propagation via the "E layer" expected on up to 90% of days of month at this time and frequency.
- **P** A fair mixture: up to 90% chance of a path using "F mode" and between 50% and 90% probability of an "E layer" path.
- **B** A good mixture: up to 90% chance of a path using either "E layer" or mixed "F" modes.
- **M** A good mixture of combined "F" modes - both first and second mode up to 90% of the time.
- **S** Second "F" mode conditions should apply on at least 90% of days this month for the given time and frequency.
- **A** High atmospheric absorption of the signal is likely - better to use a higher band. Too close to the ALF for good HF signals.

West - England (short path)

```
28.5
24.9        ......
21.2        %%%%%%.
18.1       .FFFFF%%.....
14.2 ...   AAAFFFFF%%%%%......
10.1               AFFFFF%%%%
 7.2                 FFFFFFF
 3.6                 FFFFFFF
 1.8                 FFFFFFF
 0.9                 FFFFFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - England (long Path)

```
28.5
24.9
21.2           ..
18.1           %%..
14.2          %FFF%%..AA  AA
10.1          AA
 7.2
 3.6
 1.8
 0.9
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - Central and East Coast USA

```
28.5
24.9
21.2 .                      ..
18.1 %.            .....   .%%
14.2 AAA           %%%%....%FA
10.1          A%%.FF
 7.2           FFFF
 3.6           FFFF
 1.8           FFFF
 0.9           FFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

Perth - West Coast USA

```
28.5
24.9  ..
21.2 .%%.                   ..
18.1 %FF%.           ..    .%%
14.2 AAAAAA. ....... %%....%AA
10.1          FF%%%%%FA
 7.2           FFFFFFF
 3.6           FFFFFF
 1.8           FFFFFF
 0.9           FFFFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - South America

```
28.5
24.9
21.2    .....   .
18.1 .%%%%%%.. .%%.          .
14.2 FFFFFFFF%.%FFF%AA     .%F
10.1           A           A
 7.2
 3.6
 1.8
 0.9
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - West Indies

```
28.5
24.9
21.2 ..                      .
18.1 %%     .    ..        ..%
14.2 FF%AA.....  %%%.AA   A%FF
10.1          A..F
 7.2           FFA
 3.6            F
 1.8            F
 0.9            F
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - Japan

```
28.5   .%%%%..
24.9   %%FMM%%.
21.2 ..MMMMMS%%.             .
18.1 %%MMMMMSS%%..          %%
14.2 SSMMMMMSSSS%%.......  .%S
10.1          SSSSS%%%%%%..SA
 7.2           SSSSSSSSSS%S
 3.6            SSSSSSSSSSS
 1.8            SSSSSSSSSSS
 0.9            SSSSSSSSSSS
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - Central Europe

```
28.5
24.9       .......
21.2       %%%F%%%.
18.1      .FFFFFF%%....
14.2 ...  AAAAFFFFF%%%%.......
10.1               FFFFF%%%%F
 7.2                FFFFFFFF
 3.6                FFFFFFFF
 1.8                FFFFFFFF
 0.9                FFFFFFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - Middle East

```
28.5     ...%%....
24.9     %%%%%%%%..
21.2    %MMMMMMMM%%.
18.1    FMMMMMMMMM%%...
14.2 . .MMMMMMMMMMMMM%%%......
10.1 S          ASMMMMMMMMMMMS
 7.2              AMMMMMMMMMA
 3.6               MMMMMMMMM
 1.8               MMMMMMMMM
 0.9               MMMMMMMMM
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - North Africa

```
28.5         ..
24.9        .%%...
21.2       .%%%%%%.
18.1       %FFFFFF%..  .
14.2 .... AAAAAFFFFF%%%%%.....
10.1                AFFFFF%%F
 7.2                 FFFFFFFA
 3.6                  FFFFFF
 1.8                  FFFFFF
 0.9                  FFFFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - Wes Africa (short path)

```
28.5
24.9        ......
21.2  ...   %%%%%..
18.1 .....  F%%%F%%.         .
14.2 %%%AAAAAAAAAAAA%........%
10.1                  AFF%%%F
 7.2                   FFFFFA
 3.6                   FFFFF
 1.8                    FFFF
 0.9                    FFFF
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - West Africa (long path)

```
28.5     .
24.9  ....    ..
21.2 .%%%%.   %%.           ..
18.1 %%%%%..  F%%.....     .%%
14.2 AAAAAA. %FFFFAA%%%...%AAA
10.1
 7.2
 3.6
 1.8
 0.9
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

West - South Africa (short path)

```
28.5
24.9
21.2      ........
18.1     .%%%%%%%%.
14.2 .. .%MMMMMMMMM%...     ..
10.1 M AA        ASSMMMM%%%%MM
 7.2                AMMMMMMMM
 3.6                 MMMMMMM
 1.8                 MMMMMMM
 0.9                 MMMMMMM
 MHZ !     !     !     !     !
 UT 00    06    12    18    24
```

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- **Icom** IC-2SA 2M HT, 48 mems + call chnl with BP-90 batt pack, 5W output, manuals etc $300. **Tokyo Hy-Power** HC-500A ATU 160-10M $150. Home-brew pwr supp, 20amps @ 13.8V professionally-made $185. **Bencher** iambic keyer, chrome BY2 $100. **Kenwood** head phones H-6 $25. Ray, VK3CDR (03) 726 9222. Transmitting gear sold to licensed amateurs only.
- **Icom** IC-745 HF xcvr, Icom PS-15 pwr supp, MFJ ATU deluxe versa tuner-11. Kent straight brass Morse key MM004, Werner Wulf multiband vert ant 10-80m. All items are as new, with manuals & receipts available. Sell as wkg station for $1800. David, VK3DLJ (03) 562 1771. Licensed amateurs only.
- **Kenwood** TH-28A 2M HT, dual-band rcve, 12mths old. **Nally** tower, 2-sect, dismantled ready to transport $500. VK3DNA (053) 34 2818. Transmitting gear sold to licensed amateurs only.
- **Kenwood** TS-140S HF xcvr. 100W all modes, gen cov RX, orig boxes, books. Laurie, VK3BBC (060)

77 1285. Licensed amateurs only.

- **Kenwood** TS-680S HF+6M xcvr, mtchg PS-50 pwr supp & AT-230 auto ATU with pwr & SWR metering, MC-80 desk mic. C/W manuals & accss, all EC $1750. Maurice, VK3ADJ (056) 78 0694. Licensed amateurs only.
- **Kenwood** TS-690S HF+6M xcvr, 18mths old, inbuilt auto ATU, $2000. **Kenwood** PS-52 pwr supp, $400. Both mint cond, with orig packing. Phil, VK3IN (059) 62 4958. Transmitting gear sold to licensed amateurs only.
- **Mitsubishi** Delegate transportable analogue cellular phone, working but missing handset $110. **Tower** 7m, brand new $90. **Data General** 132-char ASCII terminal with all hndbks, VT-220 model $70. Box of 900MHz cellular base station modules, incl 50W mosFETs. **Panasonic** GPZ-5500 GPS rcvr with hndbks & chrgr $1000. David, VK3HZ (041) 432 8877. Transmitting gear sold to licensed amateurs only.
- **Morse keys** new MK-701 single paddle $50; MK-706 Iambic paddle $85; Clipsal hand key mint $45; PMG vintage brass key $25. Chas, VK3IB (053) 89 1791 2-6pm Mon-Fri only.
- **NEC** laptop PC, model PC-16-01. Two 3.5" FDD, 640K RAM, V-30 CPU, runs on 240VAC, 13.8VDC or int batt. Ideal port packet term VGC. $230. Terry, VK3ZXY (03) 592 3514
- **Satellite** rcvr with 1.2M dish, KU band, with 15m coax & connectors. The lot $600 ono. Phil (03) 876 4164
- **Shack clearance**: Nally self-supporting tilt-over winch-up tower & 9-el ATN log periodic, S/S hardware, Create HD auto rotator, Kenwood PS-30 pwr supp plus more. Patrick, VK3GGE (051) 99 2811
- **Telereader** CWR-685E plus kybrd & inst manual. EC for CW practice, adj speeds $250. VK3DND (051) 53 0717
- **Uniden** 2020 HF xcvr, spare finals, with 5-band trap vert, Mullard No 7 (Army type) ATU, 2M 5-el beam $800 the lot. Harry, (03) 489 2001 or 853 5769. Licensed amateurs only.
- **Wanted**: 500Hz CW filter for Yaesu FT-101E. Tim, VK3BCN (03) 751 1563
- **Wanted**: six metre FM module for *Icom IC-901* multiband mobile system — new or used, going or no. Will pay very fair neg price. Chris, VK3CE (018) 35 3599 (almost) any time
- **Wanted**: for Icom IC-901 10M & 6M modules. Damien, VK3CDI (054) 27 3121
- **Yaesu** FT-1000 HF all-mode xcvr, as new cond, compl. with BPF-1 (bandpass filt) manual, mic. In orig pack $4600. Rob, VK3JE (060) 37 1262 or (03) 584 5737. Licensed amateurs only.
- **Yaesu** FT-101E HF xcvr, with workshop manual, spare new driver & PAs $550. **Yaesu** FV-101B ext VFO $100. YD-148 desk mic $90. All mint cond. Bob, VK3UY (03) 374 2416. Transmitting gear sold to licensed amateurs only.

VK4AREA

- **Yaesu** FT-470 dualband FM HT, with two FNB-2 and one FNB-4 battery packs, NC-37 fast chrgr, soft case, manual, boxes, mint cond $545. Ross, VK3SR (03) 481 8482. Licensed amateurs only.

- **Antenna** system: 13M wind-up tower, CDE

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- **Icom** IC-751A HF xcvr $1400. **Icom** PS-30 pwr supp $400. **Icom** AT-500 auto ATU $800. **Icom** IC-2KL solid-state amp $2300. **Yaesu** FT-736 quad-bander $2300. Lou, VK4ATX (074) 98 2152. Transmitting gear sold to licensed amateurs only.
- **Icom** IC-761 base station HF rig. This unit is in beautiful unmarked cond & is comp with hndbk & mic. $2850 ono. Mick, VK4BMT Ph/fax (074) 98 2176.

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- **Kenwood** SW-100A SWR/pwr meter for mobile use, with backlight, remote sensing 1.8-150MHz 0-150W $50. Neil, VK4BIT (07) 351 6589
- **Kenwood** TH-26A 2M HT. Has manuals, DC pwr supp, protective case, orig box, EC $385. Mike, VK4BTS (07) 300 4454. Licensed amateurs only.
- **Kenwood** TR-751A 2M all-mode xcvr, fully optioned $795. **Kenwood** TH-79A dual-band HT with SMC-33 mic. $795. Glen, VK4UGC (075) 35 0919. Licensed amateurs only.
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- **Wanted**: Triplett master tube checker, mod 1210A with ops manual. Kenneth Jaffrey, 9 Mandalay Ave, Nelly Bay 4819
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- **Linear amp**, Hunter Bandit 2000B desktop 80-10M. Uses four 572B tubes, in VGC. 1.2kW output $750. Alek, VK6APK (09) 246 3490

VK7 AREA

- **Kenwood** TS-520S HF xcvr, with mic, hndbk, orig carton. EC, one owner. A bargain $495. Chris, VK7VH/4 (07) 285 5241. Licensed amateurs only.

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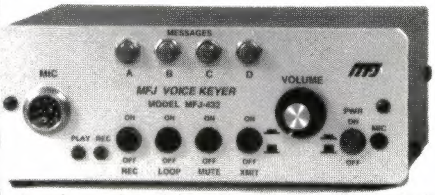

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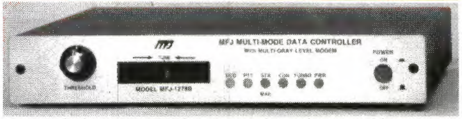

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